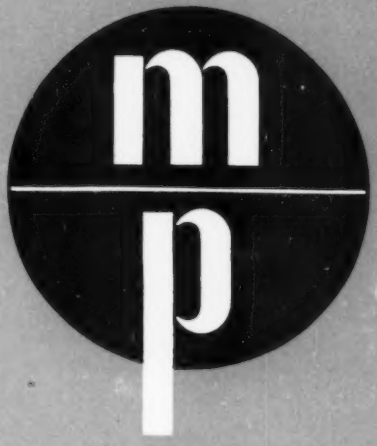
MODERN PLASTICS

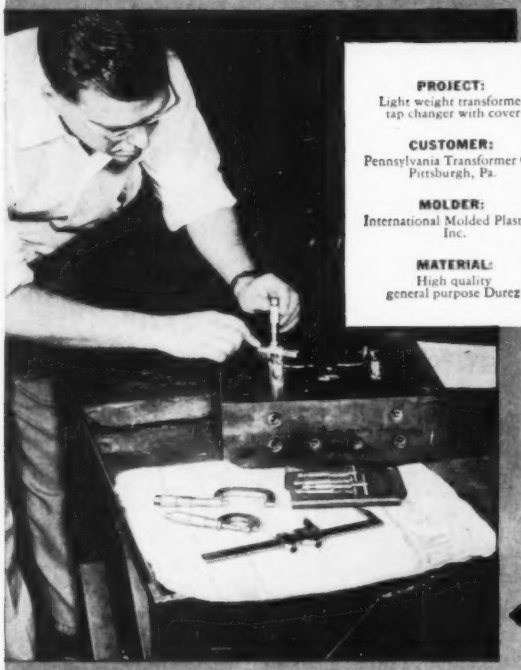


NOVEMBER 1949

It pays to use your custom molder's know-how

says another electrical equipment producer

No. 11 in a series on Plastics Skill at Work . . .



PROJECT:
Light weight transformer tap changer with cover

CUSTOMER:
Pennsylvania Transformer Co. Pittsburgh, Pa.

MOLDER:
International Molded Plastics, Inc.

MATERIAL:
High quality general purpose Durez



SKILLFUL PLANNING replaced an open porcelain transformer tap changer with an enclosed Durez phenolic plastic unit. New product is safer, looks better, costs less.

PRECISION PRODUCTION is due in large part to accuracy of the mold. Tap changer molds designed and made by International meet all requirements.

● This example of profitable molder-customer relations is interesting, not because it is unusual but for a precisely opposite reason—because it is typical.

Pennsylvania Transformer Company showed their custom molder an improved design that met higher safety standards than previous models. Following the custom molder's habit of applying constructive thought before going ahead, this molder suggested engineering changes that led to better molding technique, greater operating efficiency, and lower production costs.

Plastics men with practical know-how and active interest in their customers' problems can be of profitable service to your design and production departments. Their skill with the versatile Durez phenolics should help you in developing products that look better, wear longer, and sell faster.

Deciding which phenolic compound will do the job best is a small part of a good custom molder's field of cooperation. Call your molder in early, when he can be of greatest service. It's an advantage, too, when you have the specialized experience of a Durez field technician at your planning sessions.

A new hit with plastics users everywhere is the handy "Durez Check-Chart." Write for yours. Durez Plastics & Chemicals, Inc., 1211 Walck Rd., N. Tonawanda, N. Y.

DUREZ

PHENOLIC RESINS

- MOLDING COMPOUNDS
- INDUSTRIAL RESINS
- PROTECTIVE COATING RESINS

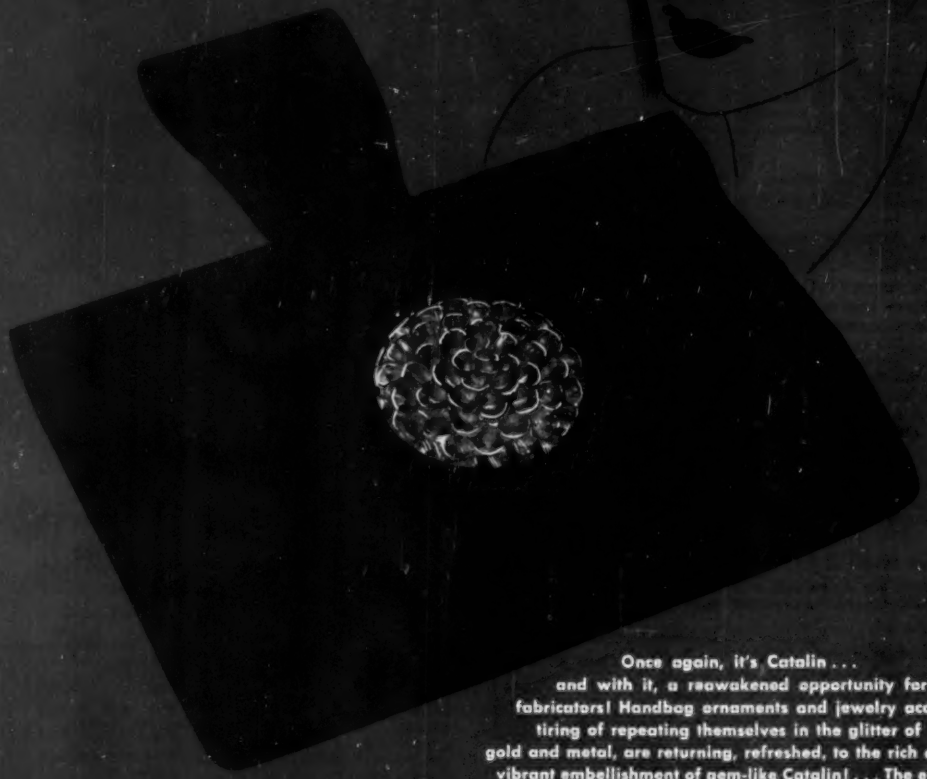
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OF

Catalin

HANDBAG AND
JEWELRY
ACCENTS





Once again, it's Catalin . . .
and with it, a reawakened opportunity for
fabricators! Handbag ornaments and jewelry accents,
tiring of repeating themselves in the glitter of
gold and metal, are returning, refreshed, to the rich and
vibrant embellishment of gem-like Catalin! . . . The entrancing
complements of Catalin *jade* . . . The brown-to-brown
match-making of light-embued Catalin *shell* . . .
The contrasting crystal-like sparkle of Catalin *clear!*
Catalin, now more beautiful than ever, is ready to
help you capitalize on fashion's latest nod of approval.
Inquiries invited!

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MODERN PLASTICS*

VOLUME 27 NOVEMBER 1949 NUMBER 3

CONTENTS

GENERAL

The Strength of the Industry (Editorial) 5

Progress Report on Plastics Monofilaments 69
A survey of the plastics materials used to produce monofilaments—and of what these monofilaments are being used for today

Metallic Polystyrene 76
Aluminum, bronze, and copper colored plastics offer new competition to metals, particularly in decorative applications

Vinyl Coating for Wire 79
Luminescent vinyl extruded over bright copper wire produces an iridescent effect. Christmas tree lights are a natural application

Phenolic Improves Gasket Cutter 80
Production costs were cut by 50% and tooling costs by 25% through redesign and material change

Alkyd Molding Compound Goes to Work 81
by H. W. De Vore
Fast molding material, only a year old, is already finding product acceptance

Wireless Christmas Tree Lights 84
Fluorescent acetate ornaments emit a soft and pleasing glow when exposed to ultra-violet light

Phantom Model of Flying Wing 85
Acrylic and acetate used to produce a scale model to aid in preparing production assembly drawings

What's New in Vinyl Spread Coating? 86
Continuing the discussion started last month on new equipment and processes

Plastics Products 90
New applications which capitalize on the functional and merchandising advantages of plastics

New British I.C.I. Plant 136
by John S. Trevor

Glass-Fiber Hose 138

Playtime Clock 141

White Mineral Oil, a Selective Plasticizer 142
by R. K. Rhodes

Camera Flash Unit 144

Costs Cut, Sales Boosted 146

PLASTICS ENGINEERING

Plastic Foundry Matchplates 95
by Franz Schumacher

Automobile Lenses Go to Acrylic 101

TECHNICAL

Effect of Outdoor Exposure on Plastics 107
by John K. Long

Vinyl Plastisol Compounding 111
by W. D. Todd

DEPARTMENTS

Plastics Digest 118

U. S. Plastics Patents 120

New Machinery and Equipment 126

Books and Booklets 130

Production of Plastics Materials 134

The Plastiscope 168
News of the Industry; Predictions and Interpretations; Company News; Personal; Meetings

PUBLICATION OFFICE: Orange, Conn. Executive and Editorial Office: 122 E. 42nd St., New York 17, N. Y. Published each month by Modern Plastics, Inc. Entered as second class matter, at the Post Office at Orange, Conn., under the act of March 3, 1879.

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Subscription $5.00 a year, $8.00 for two years in the U. S., its possessions, and South America. Canadian subscription $5.50 a year, $9.00 for two years. All other countries $6.00 a year, $10.00 for two years, payable in U. S. currency. Price of this issue 75¢ per copy.

*Reg. U. S. Patent Office.

Dolls and puppets molded from Geon paste resin by Lastic-Plastic, Burbank, California. Designed by Maurice Seiderman. Distributed by Walter Fleischaker.



New faces in the toyshop!

...because of Geon paste resin

THESE dolls are so lifelike you'd swear they are smiling back at you. Fine detail and molding of the heads, hands and shoes put them in a class apart.

Credit Geon paste resin, the material from which these parts are molded, for their saleable features. For here is one of the most important developments in the entire field of polyvinyl plastics. Now let your imagination start playing with ideas to see what it can do for you!

You don't need heavy or expensive mixing equipment for Geon paste resin—for this thermoplastic paste-forming resin is easily dispersed in plasticizers. Nor is there need for volatile solvents because the plasticizer is the only liquid required to form fluid pastes. You can mold, cast, or use it for coating and dipping.

Perhaps these dolls have suggested a new idea to you or one that will improve a product which has fallen behind in the sales race. If so, please write us. We will be glad to help you with any projects you may have in mind using Geon paste resin or any of our other polyvinyl materials.

We do not produce finished products from our materials, but our technical service is, of course, always ready to help with the development of your ideas. Please write Dept. N-11, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. In Canada: Kitchener, Ontario.



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GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers



Chicago Molded Plastics — of course!

Here is beauty and utility to satisfy the most discriminating. It's the handsome new Motorola Model 7VT2 table receiver . . . a rare combination of genuine beauty and top flight performance at a remarkably low price. It is Motorola's answer to television for the mass market. One of the major factors in making possible this remarkable achievement is the utilization of Chicago Molded Plastics for the cabinet, resulting in durability and exceptional beauty as well as in important economies in first cost.

•

The pleasing design of this cabinet, carried out in rich mahogany or lustrous ebony material with gleaming gold trim, provides instant eye-appeal. It's solid and sturdy, too, with extra thick walls and reinforcing ribs. Though it measures 9" x 16" x 16½", it weighs only 9 lbs. As a result, the entire unit weighs a mere 25½ lbs. It is compression molded in one piece in a single operation ready for fast, low cost assembly with no applied finish required.

Motorola is just one of hundreds of industrial leaders who look to Chicago Molded as their primary source of supply. And for good reason. Chicago Molded offers a complete service . . . unbiased recommendations . . . and undivided responsibility for the entire job.

Whether your job calls for compression, injection or plunger molding, we have ample facilities for all three methods of production. We operate one of the best equipped mold-making departments in the industry. Our equipment includes the most modern presses in every needed size and type for maximum efficiency and economy. And . . . of utmost importance . . . this service is backed by more than thirty years experience in plastics. These are facts worth considering. That's why we suggest you discuss your plans with a Chicago Molded engineer. Just write or phone. There's no obligation.

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MODERN PLASTICS is regularly indexed in Industrial Arts Index and Industex.

EDITORIAL

The Strength of an Industry

Flexural strength is a useful property in a material, a man, or an industry. The ability to react immediately and vigorously to pressure, the ability to come through an adverse condition with backbone unimpaired is a great quality.

Flexural strength is a spiritual quality of the plastics industries just as surely as it is a physical quality of plastics themselves.

Back in 1947 the injection molders went through the wringer. Pressure at retail level brought to an end the sale of plastics merchandise that had been quickly and carelessly designed for the first post-war boom market. The future looked black for plastics housewares, toys, and other molded items.

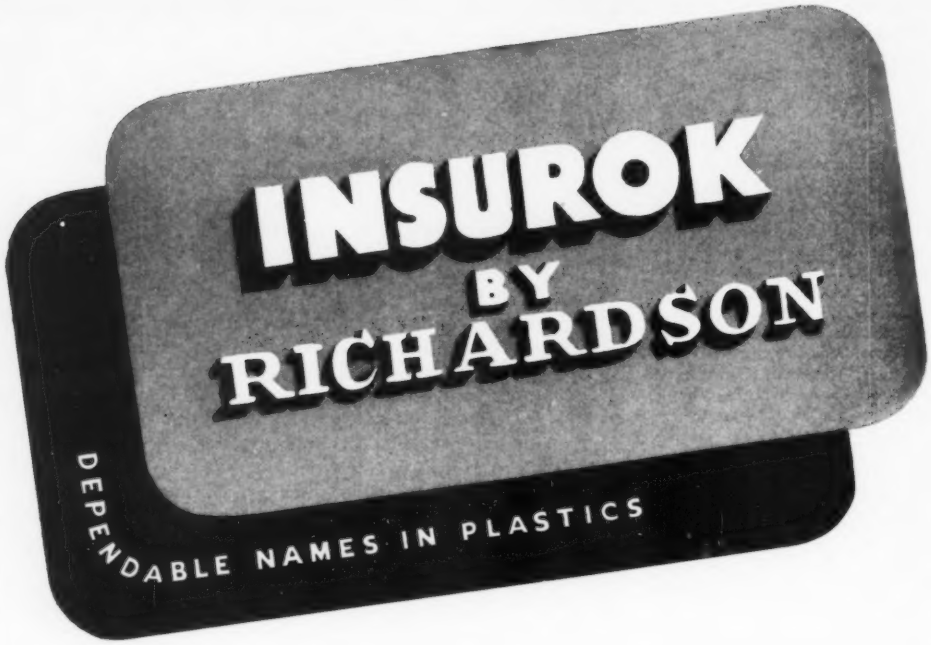
The injection molders learned their lesson quickly. They liquidated at a loss or even destroyed stocks of unsatisfactory plastics products, they scrapped thousands upon thousands of ineffective molds, they bought new and larger capacity presses, they eagerly tackled new thermoplastic materials, they went in for improved design and better merchandising . . . and today their markets have doubled.

Just about two years ago there were enough shower curtains already manufactured to equip every shower in the country with three or four sets; film was a drug on the market; film prices were worse than shaky. And what happened? The general quality of all films was improved, and better sealing was developed, and vinyl printing was perfected, and the great drapery field opened up, and the toy field expanded, and industrial applications increased, and today, with the largest production of film in history, there's an actual shortage.

The compression molders a few months ago found captive plants in the electrical industry taking over some of their output of small parts, found communications parts inventories full up, found the button market, the closure market, and other traditional outlets blocked by full stocks. Like the injection molders and the plastic film people, the compression molders wept not a tear over spilled milk. They went after and are still going after new markets. Working with the material makers, they went into production on larger pieces—television cabinets, housings, and so forth.

Some went in for proprietary manufacture of melamine tableware. Some have taken on the molding of reinforced polyester-glass pieces. Some have tackled the molding of resin-bonded wood waste. They are making themselves more versatile, are equipping themselves to serve the markets they expect, are selling under full steam today.

This attitude is proof of flexural strength. It is a property of the plastics industry.



WORTHWHILE EXTRAS

We've learned over the years that "extra" precautions pay big dividends for our customers in the planning and production of parts from Laminated and Molded INSUROK. For example:

Richardson suggestions have led many customers to alter their original designs and/or materials specifications and thus obtain plastic parts better suited to the job at hand, at lower costs.

And Richardson production experience has, in many cases, pointed the way to substantial savings and advantages for customers.

These and other Richardson "extras" are not specified on customers' purchase orders, but you get all of them . . . every time. Why? Simply because we've found that these extras make friends for us, and hold friends over the years.

If you now use, or contemplate using plastics, we sincerely believe you want and need considerate and experienced handling of your requirements. And we invite you to look, with confidence, to The Richardson Company for your needs in plastics.

Why not send us specifications today? Learn without obligation how Richardson would handle your next need for plastics.

INSUROK is a registered trade-mark of The Richardson Company

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POLYTHENE-LINED PAPER BAG PROTECTS MOISTURE-SENSITIVE GLUE

Multiwall bag with a polythene-coated ply has improved resistance to atmospheric moisture over a wide range of temperatures...plus many other advantages

WHEN The Borden Company needed an economical, damp-proof package for a very hygroscopic powdered resin glue, they chose a sturdy, lightweight, inexpensive multiwall paper bag, one layer of which has a thin coating of Du Pont polythene plastic. These bags keep moisture out during handling and shipping, protect contents until used. Compared with many other types of containers, the empty bags save up to 91% of storage space—save shipping costs, too.

The use of paper coated with Du Pont polythene in multiwall bags provides these advantages:

- **better protection against moisture**
- **better chemical resistance**
- **better strength**
- **better grease resistance**

These characteristics are retained over a wide range of temperatures. The use of a polythene-coated ply also offers greater versatility, since film thickness can be varied to meet specific requirements.

Many other "hard-to-pack" products are being successfully shipped in these bags, including calcium chloride, dry milk, meat trimmings, sodium bisulfite, benzene hexachloride, quicklime, various synthetic resins.

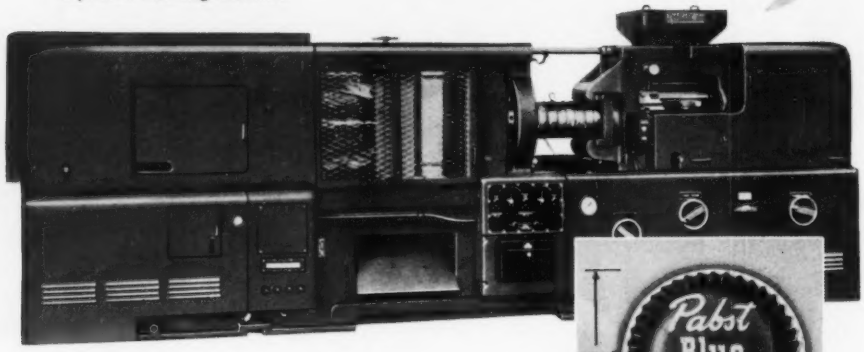
The multiwall bag is only one of many new packaging applications of polythene. The new coating technique used here is a joint development of St. Regis and Du Pont technical men. Du Pont representatives will gladly work with extruders, molders, or converters, or will suggest suppliers who can meet specific needs for packaging or other uses of plastics. Write today for free literature on polythene and other versatile Du Pont plastics.

(Multiwall bag made by St. Regis Paper Co., New York, New York.)

E. I. du Pont de Nemours & Co. (Inc.), Plastics Department, Main Sales Offices: 350 Fifth Ave., New York 1, New York; 7 S. Dearborn St., Chicago 3, Illinois; 845 E. 60th St., Los Angeles 1, California.

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Plastics
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The 10H-32 Oz. Reed-Prentice injection molding machine.





15" x 18¼" area, 40 Oz. over-capacity shot, molded on the 10H-32 Oz. model.

Blue Ribbon ...a sign of PERFECTION

The famous sign for Pabst Blue Ribbon beer has new eye appeal as injection molded from plexiglass on the Reed-Prentice 10H-32 Oz. model by General Machine & Tool Co. of Walled Lake, Michigan for Cincinnati Advertising Products Company, designers and manufacturers.

With over 300 sq. in. of projected area, the shell face presents a difficult problem in the control of material. Weighing 40 ounces, this over-capacity shot is produced at a 45 second cycle from a single cavity mold. Perfect results were obtained because Reed-Prentice machines give absolute control of the three vital molding variables...time, temperature and pressure. Molders everywhere are taking advantage of the practical working features of Reed-Prentice injection machines. Investigate the complete line . . . write Dept. D for information on the 2, 4, 8, 10, 12, 16, 24, 32 and 60 Oz. capacity models.

THE WORLD'S LARGEST MANUFACTURERS OF INJECTION MOLDING MACHINES

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Today, when small pennies saved are again big pennies earned, your plastic product can benefit greatly from a beforehand discussion with Consolidated's sales engineers and technicians. That the types of service we render can advantageously fit your particular requirements, is indicated by the customer-confidence reposed in us by America's foremost manufacturers.

Consolidated is an "all-under-one-roof" control (135,000 sq. ft.)—concentrating upon sound plastic design, economical production, price-and-time savings to the customer. From preliminary sketches, material selections, specifications, estimates—and on through the processes of molding (compression, transfer, plunger, injection) and finishing—ours is the kind of know-how that guarantees your blueprint in plastic—the right plastic—rightly priced!

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Please Address Dept. G-11

CMP

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Consolidated *Molded Products Corporation*

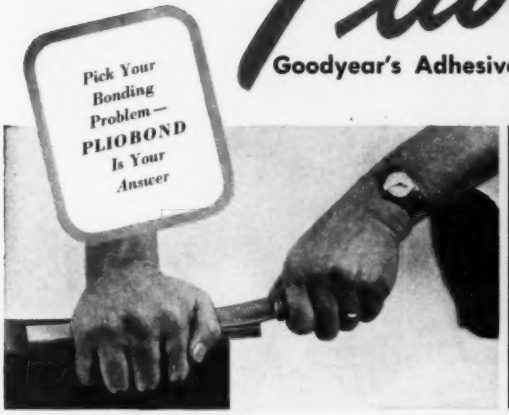
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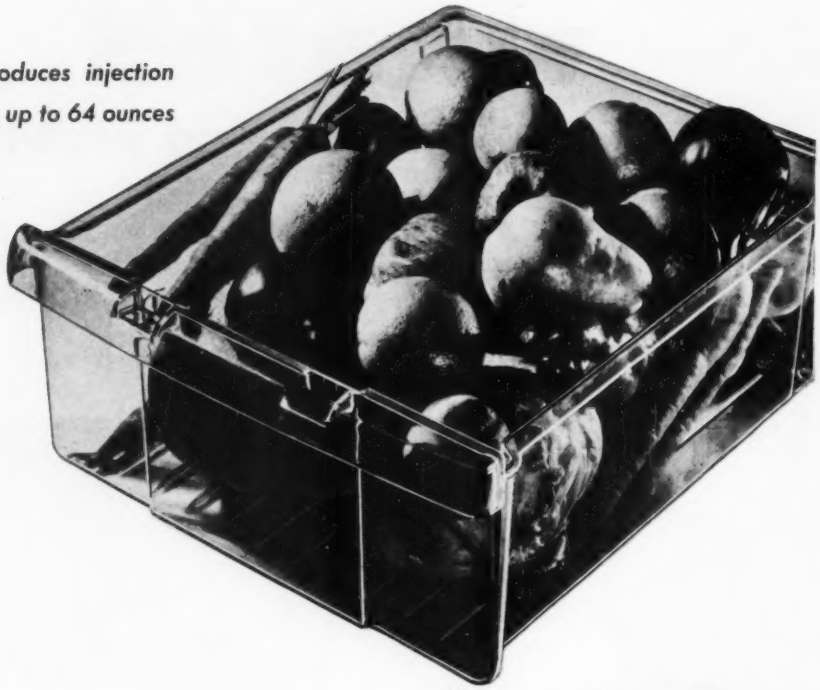
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GOODYEAR

Pliobond T. M. The Goodyear Tire & Rubber Company

Loma produces injection moldings up to 64 ounces

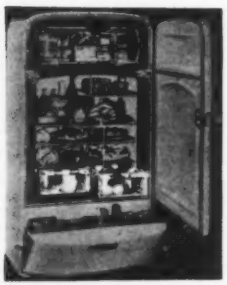


this BIG molding is Strain Free

It's molded for Admiral Corp. by Loma



Sixty *strain-free* Hydrator Pans turned out by Loma hourly.



Just consider these facts—material, polystyrene; weight, 31 ounces, dimensions, $15\frac{1}{8}$" x $12\frac{5}{8}$" x 6"; projected area, 195 square inches—and you'll immediately realize that molding this Hydrator Pan *without strains* is a major accomplishment.

LOMA injection molds this important component of the famous Admiral Dual-Temp Refrigerator on a NEW PREPLASTICIZING UNIT—WHICH USES LOWER PRESSURES THAN CONVENTIONAL MACHINES. This system permits a molding technique that produces moldings with minimum internal stresses—even on pieces as large as 64 OUNCES and 600 SQUARE INCHES IN PROJECTED AREA. Because they are free from strain—crazing, cracking and other mechanical failures common to ordinary large moldings are unlikely.

As a buyer of moldings, you'll find that LOMA provides a complete assembly and finishing service for your product. Merchandising and national distribution for most lines are offered to aid in your selling program. Loma's large centrally located facilities usually bring the cost of moldings down below the price charged in your own locality.

Send LOMA your parts plans, specifications or sample parts. We're set to run anything from 4 to 64 ounces using existing molds or ones we'll make for you. *WRITE AT ONCE.* Ask about our MERCHANDISING PROGRAM.

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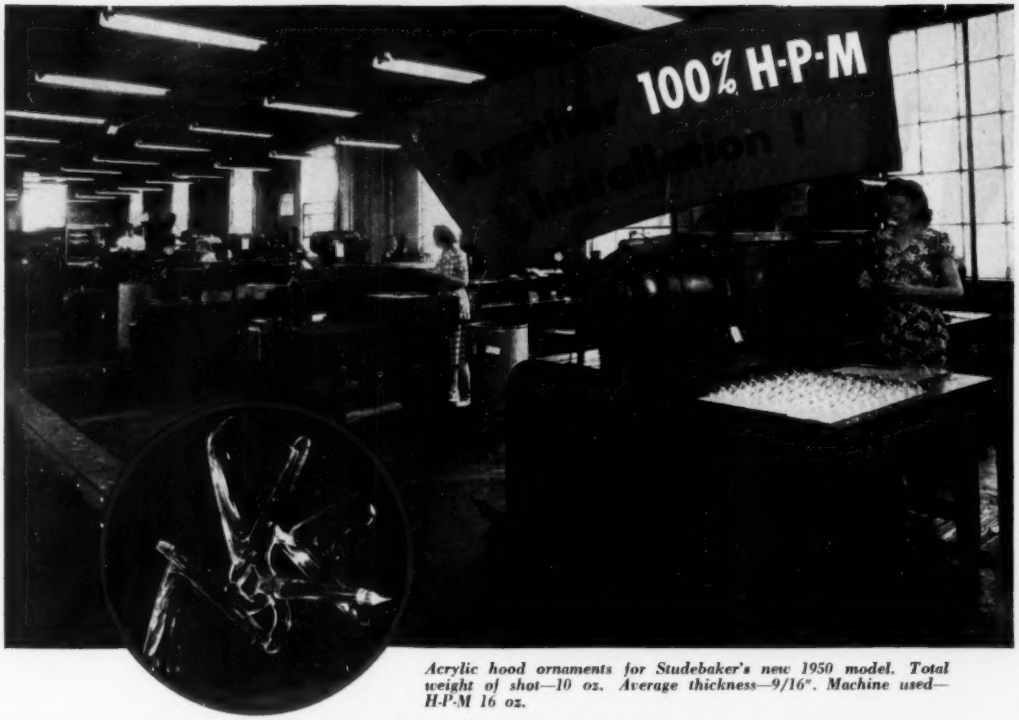
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Loma PLASTICS, INC.

1111 FOCH STREET • FORT WORTH 7, TEXAS



Acrylic hood ornaments for Studebaker's new 1950 model. Total weight of shot—10 oz. Average thickness—9/16". Machine used—H-P-M 16 oz.

At Sobenite . . . 10 H-P-Ms Operate 240,000 hours . . . with no major down time!

In 1937, Sobenite installed its first H-P-M Injection Machine. It is still going strong with original pump and valve equipment. Today, this company operates ten H-P-Ms ranging from 1½ to 16 oz. capacities. Five of them are modern postwar models . . . one was installed only a few months ago. A check of the maintenance records of these machines indicates no major down time for repairs.

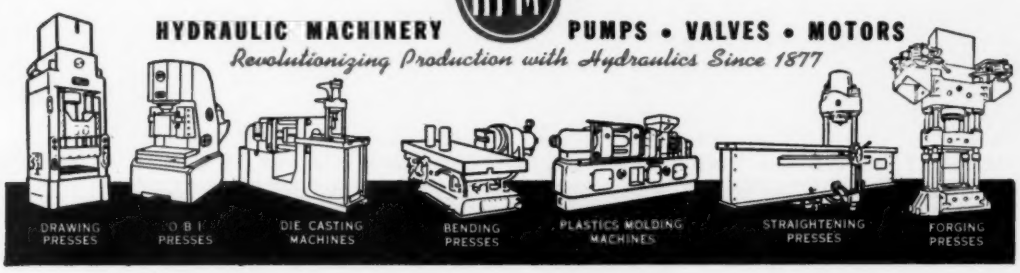
You can profit from Sobenite's experience when you install dependable, trouble-free H-P-M Injection Machines. You will also enjoy the benefits of H-P-M's fast cycle . . . straight line all-hydraulic clamp for quick mold set-up . . . low scrap loss . . . high quality production. H-P Ms are built in a complete range of sizes up to 48 oz. per cycle. Call in a nearby H-P-M Engineer today. Write for Bulletin 4802.

THE HYDRAULIC PRESS MFG. COMPANY
1010 Marion Road, Mount Gilead, Ohio, U.S.A.

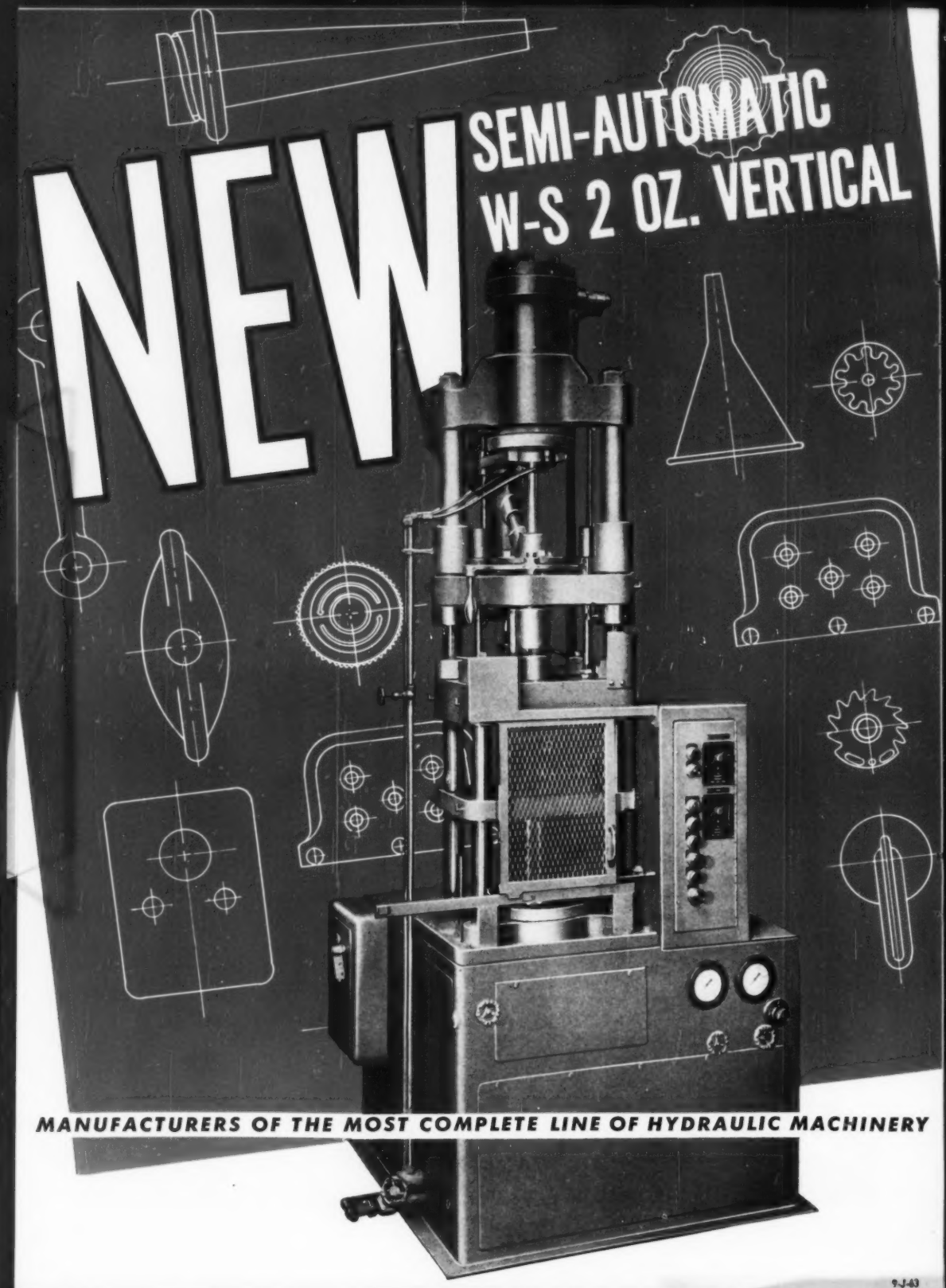
HPM

HYDRAULIC MACHINERY **PUMPS • VALVES • MOTORS**

Revolutionizing Production with Hydraulics Since 1877



NEW SEMI-AUTOMATIC W-S 2 OZ. VERTICAL



MANUFACTURERS OF THE MOST COMPLETE LINE OF HYDRAULIC MACHINERY

9-J-63

INJECTION MOLDING MACHINE



READY FOR YOU... SEE IT PRODUCE

FIRST again, Watson-Stillman engineering ingenuity and production "know-how" have ready for *YOUR* inspection and purchase an inexpensive but amazing *NEW* production tool that will be an immediate *PROFIT-MAKER.*

Economical in *FIRST* cost, the NEW W-S 2 oz. Semi-automatic Vertical Injection Molding Machine serves in a dual capacity. Low operating cost makes it ideal for laboratory and development work where a variety of small items must be molded at minimum expense. Or, its full capacity can be utilized wherein its speed and operating efficiency make it an economical small item large-scale production tool.

Semi-automatic with SAFETY controls and features heretofore only considered possible in large machine design and construction, the *NEW* W-S Vertical Injection Molding Machine—with all the advantages you could possibly desire in a 2 oz. machine—is on parade—*NOW*—ready to be inspected—not in graph, blue print or production stage—actually die equipped and producing for one of the leaders of the industry. And, all you have to do is make a date to see for YOURSELF.

The specifications indicate why leaders are rapidly adopting the W-S 2 oz. Vertical. They'll help you visualize what this machine can do in your plant . . . to see it working give us a call—No obligation.

SPECIFICATIONS

Capacity of hopper	15 lbs.
Capacity of hopper feed	7½ cu. in.
Maximum ounces per shot, acetate	2
Plasticizing capacity of cylinder per hour	25 lbs.
Maximum cycles per hour	300*
Diameter of injection plunger	1¼"
Diameter of hydraulic injection cylinder	5"
Stroke of injection plunger	6"
Injection pressure per sq. in.	19,000 lbs.
Maximum hydraulic system pressure	1,200 lbs.
Clamping capacity	36 tons
Stroke of clamping ram	8"
Diameter of clamping cylinder	8¾"
Daylight opening	15"
Minimum die thickness	7"
Maximum die sizes	12" x 13"
Rated maximum power consumption of heat units	2.0 K.W.
Motor hp.	5
Type of pumps used	Vickers
Oil reservoir capacity	40 gal.
Floor space required	3'3¼" x 3'4½"
Overall height	8'1½"
Shipping weight	3,500 lbs.
Speeds	
Die closing 160"/min.	Die opening 160"/min.
Injection—forward 84"/min.	Injection—return 190"/min.
Max. injection speed at 19,000 psi injection pressure	84"/min.

*Depends on molding material and mold construction.

WATSON-STILLMAN HYDRAULIC MACHINERY DIVISION

Established 1848—Factory and Main Office: Roselle, New Jersey

Branch Office: Chicago, Ill.

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Foreign Sales Representatives: OMNI PRODUCTS CORP., 460 Fourth Ave., New York 16, N. Y., Correspondents Throughout the World



This extremely heavy, heat-resistant handle is used on the Wagner Mfg. Company's Magnalite cookwear line and withstands oven temperatures reaching 500°.

HANDLES WITH CARE!

The teakettle handle for the Aluminum Cooking Utensil Co. of New Kensington is furnished completely assembled—with right and left halves, red thumb pad, moulded-in inserts consisting of speed clips, aluminum stamped links and spring.

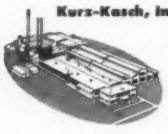


The sales appeal of this VitaCraft stamped aluminum 2-quart pan is enhanced by the typical characteristics of this phenolic handle—by smooth pleasant feel, non-conduction of heat and gleaming appearance.



Let us give you a hand with your handles—good, durable custom-moulded pot and pan handles are a Kurz-Kasch specialty, as these three different specimens attest. All three do their share in winning the markets that these quality products enjoy. They're as acceptable cost-wise as they are performance-wise—they're phenolic, plunger-moulded in high-capacity 8 & 10-cavity presses.

We also produce a fine line of stock handles and knobs. For full information on plastics—for any product that can be plunger, transfer or compression moulded—consult your local Kurz-Kasch office or write the factory. We offer complete facilities and a pioneer achievement record second to none.



Kurz-Kasch, Inc. • 1415 South Broadway • Dayton 1, Ohio

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FOR OVER 33 YEARS PLANNERS AND MOULDERS IN PLASTICS

Modern plastic materials broaden the horizon of an ancient art

. . . precision casting

More accurate castings of intricate parts . . . at new low cost



Sturdy, durable, easy-to-handle patterns of new Lustrex 15K (top) produce extremely accurate castings, as shown in this sample (bottom). Equally important is that Lustrex 15K enables precision casters to produce superior articles . . . at lower costs. *Manufactured for Indian Motorcycle Co. by Midwest Foundry Division of L. A. Darling Co., Coldwater, Mich.*

Special formulation Lustrex 15K opens new horizons in precision casting

Here's good news for manufacturers looking for a combination of extremely accurate castings . . . and new low costs: Precision casters are now producing *more accurate components*, with far lower die and tooling costs, lower production and handling costs . . . using a new special material manufactured by Monsanto.

Precision casting is now more *practicable* than ever before! This outstanding new formulation, developed by A. R. D. Corporation and manufactured solely by Monsanto for sale to precision casters through A. R. D., replaces expensive, fragile, hard-to-handle wax patterns used in ordinary casting processes. With high dimensional stability, the new patterns increase accuracy and facilitate production of intricate parts.

Best of all, this special A. R. D. process delivers these parts at low cost. Inexpensive zinc alloys can be used to cut die costs; and present equipment (including low pressure machines) can be readily and easily adapted.

In addition, use of Lustrex 15K patterns permits flexible scheduling of the precision caster's plant operations (these patterns may be stored and used later when machines are free); and the patterns are exceptionally easy to handle. Result: lower costs for precision casting.

FOR A BIGGER DOLLAR'S WORTH, BUY AND USE MONSANTO PLASTICS.

Molders: You may be called on to produce casting patterns. It can easily be done on your present equipment. And it may open up for you entirely new, profitable markets in an established, well-seasoned industry. If you want more information, write direct to A. R. D. Corporation, 70 Pine St., New York, N. Y.

Precision Casters: Here's opportunity for you to produce finer, more saleable, less expensive castings. Why not write A. R. D. for descriptive literature and technical data on this new process?

Patents pending on Lustrex 15K

THE LARGEST FAMILY OF PLASTICS IN THE WORLD

MONSANTO
CHEMICALS — PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

LOOKING FOR A *New Twist*



TO *Boost Sales?*

COME SUMMER and you'll see a *new twist* in sun glasses... America's first sun glasses with flexible temples that cling miraculously to the head without the slightest pressure.

The sales importance of this revolutionary idea is obvious . . . and typical of the merchandising know-how that has put Columbia among the foremost names in plastic products.

If you are looking for a plastic molder of high reputation with a practical, price-conscious, market-wise viewpoint, it will pay you to talk it over with Columbia.

You will find that one of the big reasons for Columbia's remarkable growth is that we not only have the knowledge and equipment for great volume production . . . we are also mass merchandisers as well, with a long list of successes in creating fast-selling products for ourselves, as well as others.

Columbia

COLUMBIA PROTEKTOSITE COMPANY, Inc., CARLSTADT, NEW JERSEY
New York Showrooms: Empire State Building



. . . then

PLEXIGLAS VM

is the molding powder to use!

Frequently you have an application which calls for the beauty, strength and age resistance of PLEXIGLAS V . . . but does not need its *extra high* heat stability. For such *medium* heat range applications more and more molders are finding PLEXIGLAS VM is precisely the right powder.

PLEXIGLAS VM offers the unexcelled crystal clarity that has made PLEXIGLAS V famous—coupled with remarkable ease of molding due to VM's very low ASTM flow temperature (140 ± 5° C at 1500 psi).

For full details of the acrylic molding powder that combines Easy Flow, Sparkling Clarity and Medium Heat Range, write us today about PLEXIGLAS VM.

Canadian Distributor: Crystal Glass & Plastics, Ltd., 282 St. Helens Ave., Toronto, Ont.

PLEXIGLAS *is a trade-mark, Reg. U. S. Pat. Off. and in principal foreign countries.*

CHEMICALS FOR INDUSTRY

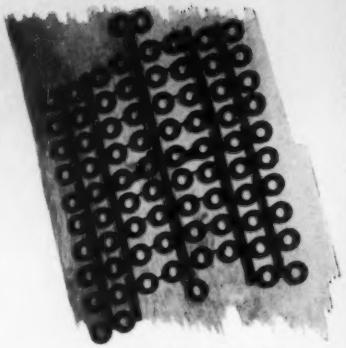
ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

NOW!

A 48 ounce INJECTION MOLDING machine for $ 37,500.*





LARGE PROJECTED AREA
64 oz. Vinylite...90 second cycle.

WHY PAY FOR IRON . . . ? This new, light-weight J-C plastic molding machine, embodying a new approach to injection molding . . . *operates under substantially lower injection pressures* . . . making possible a lighter machine *with the saving in weight passed on to you.*

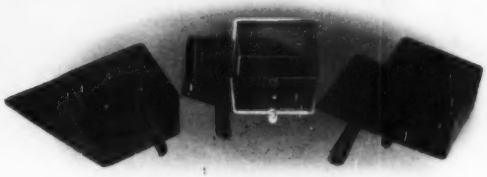
Not only do you pay nearly one-third less in capital outlay . . . but this recent advance in plastics engineering gives you a *real competitive* approach to your market and broadens your horizon both product and profit-wise. *SHOOT SUPER-SIZE MOLDINGS and TAKE IN SUPER-SIZE PROFITS!*

The J-C Press is versatile, and takes up relatively little floor space. It is an all-in-one press . . . shots can be made in 30 second cycles from 48 ounces down to 6 ounces . . . keeping the press busy during changing markets.

Jackson & Church Company makes other injection press models too (20, 48, 60 or 80 oz.)—regardless of the size of the part, from 6 oz. to 80 ozs., it can be molded on a J-C Press.

Remember . . . operating at lower injection pressures permits J-C to pass savings in weight (iron) on to you.

* Approximate



STYRENE COLORED AND INJECTION MOLDED IN ONE OPERATION ON J-C PRESS.

Here is welcome news: Injection molders may now, through use of the J-C Press, save 5¢ per pound and cut down inventories by coloring Styrene on our press.

No need to pre-color, pelletize or in any way treat pre-molded styrene. Simply buy all crystal styrene, augment with small quantities of required dye, dry mix crystal with dye, run through J-C Press and get total diffusion of color in molded parts.

Investigate this amazing development now . . . you will be able to revise your inventory downward and perfect pricing and plant operations.

NOTE: All molded pieces pictured here were molded on a J-C 48 oz. Press.

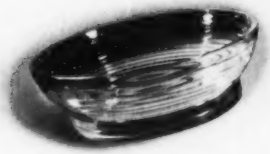
30 SECOND CYCLE

112 OUNCE STYRENE POSSIBLE BY STUFFING INJECTION CHAMBER

500 SQUARE INCH PROJECTED AREA

AVAILABLE IN 20, 48, 60 & 80 OZ. MODELS

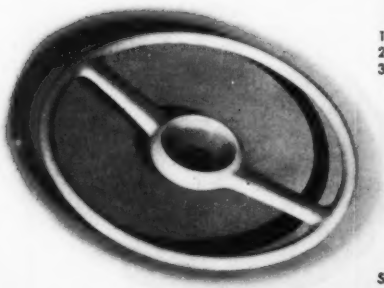




LENS MATERIAL
14 oz. Acrylic...105 second cycle.



HEAVY SECTION MOLDED IN:
1. Styrene—32 oz. 135 second cycle
2. Acetate—36 oz. 150 second cycle
3. Acrylic—36 oz. 165 second cycle



STEERING WHEEL
44 oz. Butyrate...70 second cycle

48 Oz. Machine Specifications

Ounces per shot	48 oz. Styrene
Total poundage per hr.	360 lb. Styrene
Pressure per sq. in. on material in injection chamber	10,000 p.s.i. max.
Diameter of plunger	3¼ in. diameter
Diameter of screw	3¼ in. diameter
Speed of screw	25 to 200 r.p.m.
Projected area	500 sq. in.
Locking pressure	600 tons
Stroke of clamp cylinder	30 to 36 inches
Speed of closing	350 in. per min. slowed down to 60 in. per min. for clamping
Speed of opening	425 in. per min.
Max. over-all height	18 ft.
Max. daylight opening	42 to 64 inches
Distance between tie rods	Left to right 36 in. Front to back 36 in.
Floor space required	94 sq. ft.
Approximate weight	37,000 lbs.
Speed of injection	194 in. per min. max. 20 in. per min. min.
Stroke of injection cylinder	20 inches
Extruder motor	30 hp. Fluid Drive Motor—Operated from pump motor
Hydraulic pump motor	50 hp.

J-C

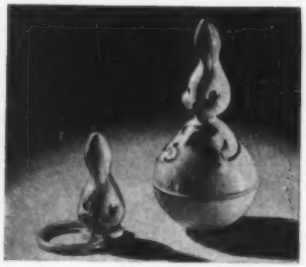
A product of

Jackson & Church Company, Saginaw, Michigan

"Work well done since '81."

Gotham project:

TEETHING RATTLE AND ROLY-POLY



Gotham efficiently assembled these fast selling children's novelties which are constructed of molded colorful acetate. For the Roly-Poly, the identical base is used in combination with several different heads which are available to create varied effects and to widen the line. All of the operations needed to assemble the units are done rapidly, perfectly, and at low cost by Gotham.. Spot painting and stencilling give these outstanding toys a fine appearance.

Gotham project:

CANDID MIDGET CAMERA



The camera was re-engineered by Gotham to its present high quality and saleability for low cost premium and retail distribution. Materials were re-specified, assembly method was improved. In three weeks a production line was turning out 10,000 cameras daily with rejects at less than 1%. Now Gotham can produce 14,000 cameras every day. Gotham does the entire job—procurement, molding, metal stamping, assembly, inspection, packing, shipment.

Gotham project:

COUNTER DISPLAY



A modern looking sales stimulator is this handsome package holder, fabricated from gleaming, clear Lucite or Plexiglas for use on cigar store counters. Designed by Gotham for quality and low-cost production, it is made by sawing and forming ⅛" sheet and then permanently cementing the sections together. This counter display provides the ideal combination of attention value and display for impulse sale items.

Gotham project:

YOUR NEXT PLASTIC PRODUCT

Gotham has the know-how and the facilities to take over any or every phase of producing your next plastic item. We design, specify materials (plastics, metals, woods, etc.) order molds and dies for metal stamping, fabricate, assemble, drop ship. You get single responsibility plus assurance that your plastic item will be turned out at a cost that will return a profit to you. Submit prints or samples and production requirements for price and time estimates.



All jobs and inquiries handled confidentially.

Gotham *plastics corp.*

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molding
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deep drawing

•

assembly
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purchasing
inspecting
packing
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Gotham does them all!

PROTECT and INSPECT with TRANSPARENT PLASTICS

Transparent acrylic plastic is the ideal material to use when strength, transparency and the ability to be formed into simple or compound curves are desired. Acrylic plastic transmits every color of the spectrum with 92% efficiency, and retains its transparency permanently despite aging and weathering. That's why acrylics are the best material for shields and housings on all types of products where it is desirable to observe inner workings, or when a formed part must possess excellent optical properties in addition to strength and resistance to breakage.

Transparent acrylics can be furnished as a sandwich structure in which the center core is made of Butacite for obtaining greater strength and impact resistance. The laminating does not materially change the optical properties which, in turn, makes these materials ideal for aircraft canopies, instrument cases, machine safety shields, marine windshields, lighting shields, roof panels on busses and taxicabs, and a host of other applications.

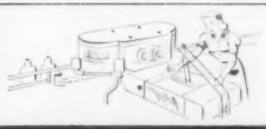
Because of our long association with aircraft companies in developing new parts and helping solve production problems, you will find our engineering experience in the fabrication of acrylics most valuable in helping you adapt transparent acrylic plastics to your product.



Our long experience with fabricating aircraft parts has made us a leader in this field. Aircraft canopies and astradomes are among the many fabricated acrylic parts that roll continuously from our production line.



Curved windshields and windowpanes for boats can be successfully produced with fabricated transparent plastics.



For food, dairy, or processing equipment where the processed material must be observed, transparent acrylic plastics are becoming increasingly valuable.

We shall be glad to assign a staff engineer to work with you in solving any problems in plastics connected with new developments in the industry.

Swedlow PLASTICS CO.

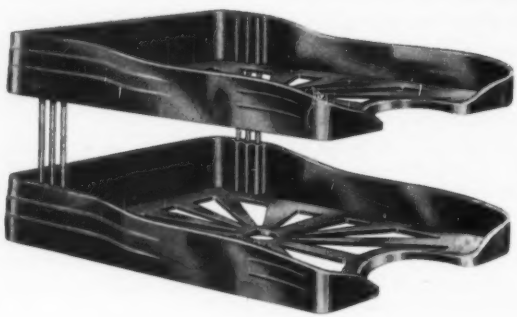
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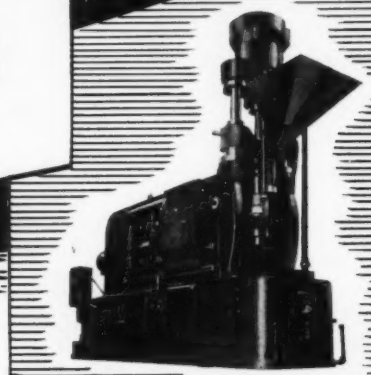
L IS FOR LARGE PROJECTED AREA

The Lester "L" is often a symbol of the exceptional achievements of Lester Injection Molding Machines. To the Bert M. Morris Company of Los Angeles, the Lester "L" has meant the ability of the Lester machine to fill a cavity of LARGE projected area in molding their most recent product—a sectional letter tray.

The company informs us that they are running this polystyrene part, weighing 11 ounces, covering 95 square inches of flat area (which is within 5% of maximum molding area), and are using only 60% of the capacity pressure. For this large, complex part the molding cycle has been cut to only 43 seconds.

Over and over again, our customers supply us with such facts, which prove that Lester features are more than just specifications—they are the backbone of the injection molding machines which are consistently producing the finest molded plastics.





Write for your free copy of the Lester Press.

LESTER INJECTION MOLDING MACHINES

distributed by LESTER-PHOENIX, INC., 2621 CHURCH AVENUE • CLEVELAND 13, OHIO

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That's where Varcum's rigid production and storage control system can relieve you of many a production headache. For once you have selected the Varcum phenolic resin that meets your requirements . . . you may reorder again and again with complete assurance that Varcum will always deliver the right resin for the right results.

VARCUM CHEMICAL CORPORATION

NIAGARA FALLS, NEW YORK

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COMPLETE ENCYCLOPEDIA
OF RUBBER AND PLASTICS MILLS



This NEW, 40-page bulletin probably contains more information on "what is available" in mills and related equipment than has ever before been published in one manual.

Here you will find a table of sizes, capacities, power requirements, overall dimensions and other data on standard mills . . . general specifications, including details of a number of attachments . . . parts lists of single and twin mill units . . . and more than thirty illustrations of designed-for-the job mills (ranging from 6" to 28" in size), complete with descriptions of the special features of each. Also illustrated are refiners, washers and crackers, as well as other F-B processing units. The Farrel-Birmingham process-testing laboratory, where manufacturers are invited to explore the possibilities of new processing techniques, and the company's specialized engineering service are also described.

If you buy, specify or are in charge of the operation of this type of equipment, you should have a copy of this fact-filled bulletin. FB-558

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MP

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Sheets • Rods • Tubes

cellulose acetate (Nixon C/A)
cellulose nitrate (Nixon C/N)
ethyl cellulose (Nixon E/C)
cellulose acetate butyrate

Molding Compounds

cellulose acetate
ethyl cellulose

... and now

rigid VINE-L sheeting

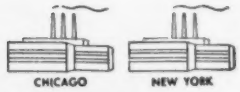
for close personal service on orders large or small, contact .....

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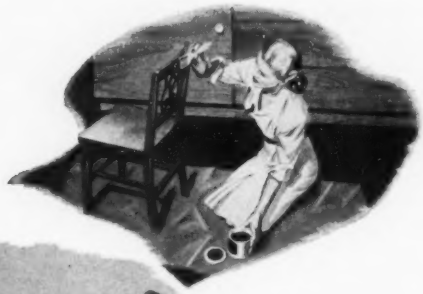
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Chicago Office: 510 N. Dearborn Street, Chicago 10, Ill.

Two modern **WITCO** plants produce all types of quality **STEARATES**...



aluminum, barium, cadmium, calcium, lead, lithium, magnesium, zinc



brightening the corner – Witco Aluminum Stearates impart a soft, silky surface to flat paints and also help keep the pigments in suspension.



music to your ears – The fabrication of plastics, which includes the making of records, is aided by the use of Witco Stearates as internal lubricants, as heat stabilizers for vinyl resins, and as mold dusting powders.



snaps out of it – Witco Metallic Stearates make it possible to release a rubber product from its mold easily. Witco Stearates are also widely used in the rubber industry as dusting powders.



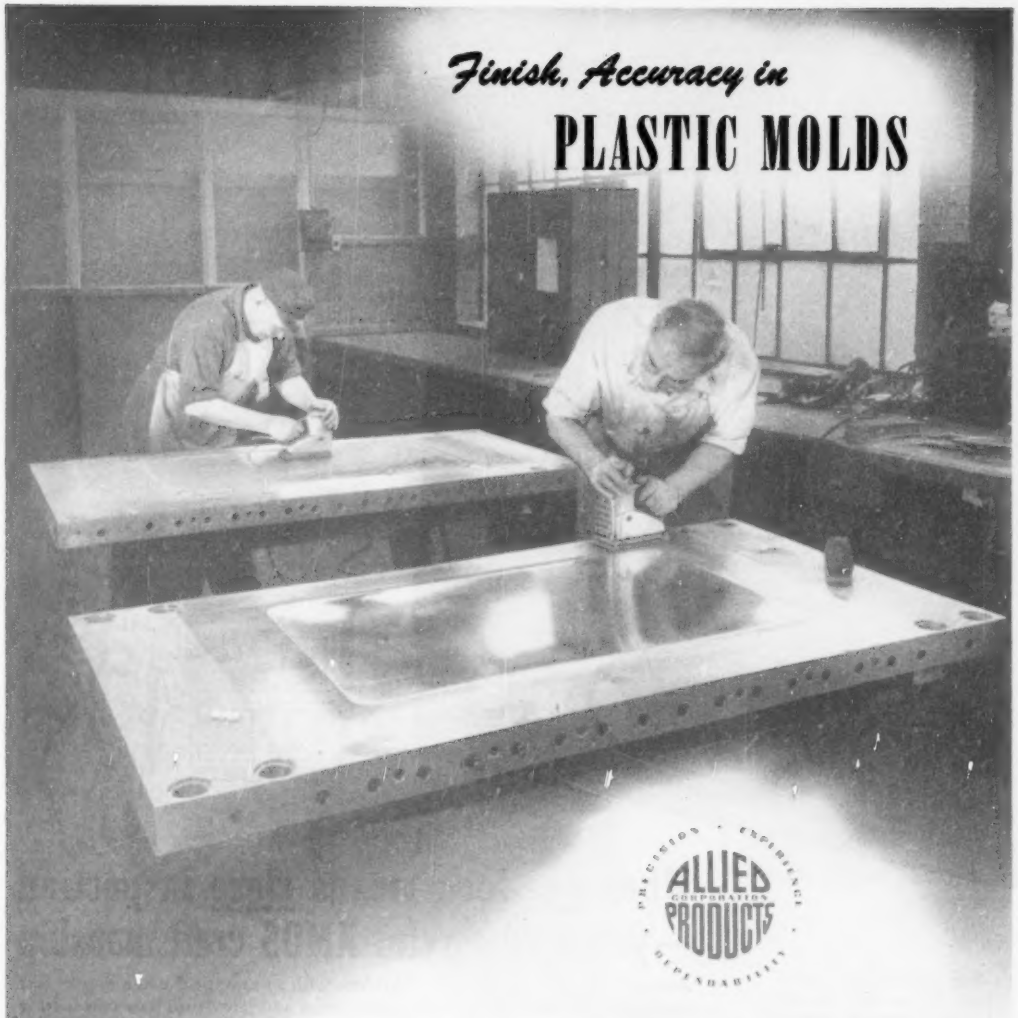
mother's helper – The soft, fluffy antiseptic characteristics of Witco Cosmetic Grade Zinc Stearate makes this product ideal for baby powders and other cosmetic uses.

For more than a quarter of a century, Witco Stearates have been produced in Witco's own manufacturing plant in New York. During the past few years productive capacity has been increased by the erection of an additional plant in Chicago. The high quality of Witco Stearates throughout the years is due to careful control of production and constant research.

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The facilities and abilities at Allied's Richard Brothers Division for producing steam-heated plastic molds were developed with the plastics industry—are in step with the requirements of this industry today. Whether your demands for molds are "run-of-mine" or unusual . . . whether you require ordinary or 1000 grit finishes . . . whether you are looking for accuracy of form and fit that may be to the highest possible degree of mold-making precision . . . Allied can and will meet your specifications exactly. We will be glad to submit quotations to you.

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SHEET METAL DIES FROM THE LARGEST TO THE SMALLEST • JIGS • FIXTURES • STEAM-HEATED PLASTIC
MOLDS • SPECIAL PRODUCTION TOOLS • R-B INTERCHANGEABLE PUNCHES AND DIES • DIE MAKERS' SUPPLIES





When one look means close inspection —you need careful AMOS craftsmanship

Write today on your letterhead for our new, 52-page booklet, picturing in full color the sales and engineering ideas developed by Amos for every industry.

Attention getting plastic parts reach out with sales appeal when they reflect the quality workmanship of this escutcheon and television lens molded for Admiral Radio Corp. Only in plastics could such beauty of design be achieved and such a *hi-speed, low-cost method of fastening be employed* . . . and only by molding-in a lens of crystal clarity could large-volume daily shipments be made.

Supplying the requirements of television "on a production basis" meant ingenious engineering, precision molding and flawless finishing. The result . . . Amos made this Admiral panel look "like a million dollars" . . . and *for less cost than by any other process.*

Now . . . how can we help you on this job of *yours?* Just call us.

Amos
MOLDED PLASTICS...
EDINBURG, INDIANA

Plastically Speaking, Are You Up-to-Date? Call Amos!



BOTTLES WITH A FUTURE



Plaxpak polyethylene bottles are now in use for more than a hundred different products—in fields ranging from corrosive chemicals to room deodorants. But this is only a sampling of what is still to come.

The design, color and decorative possibilities of the Plaxpak bottle have been barely touched. A new package form, it needs only engineered imagination's practical wand to convert its numerous intrinsic advantages into sales-getting realities. Write Plax for the complete story on the unique new advantages of the "squeezable" bottle.

PLAX
FOR PLASTIC
SQUEEZE BOTTLES & TUBES
NOT SUBSTITUTES ... IMPROVEMENTS

PLAX CORPORATION DIVISION, HARTFORD-EMPIRE CO.
P. O. BOX 1019 ★ HARTFORD 1, CONNECTICUT
In Canada — Canadian Industries, Ltd., Montreal

OFFICES IN NEW YORK CITY, SYRACUSE, PHILADELPHIA, CHICAGO, AND ST. LOUIS

NOW...
BIG MARKETS FOR EXTRUSIONS LIKE THESE

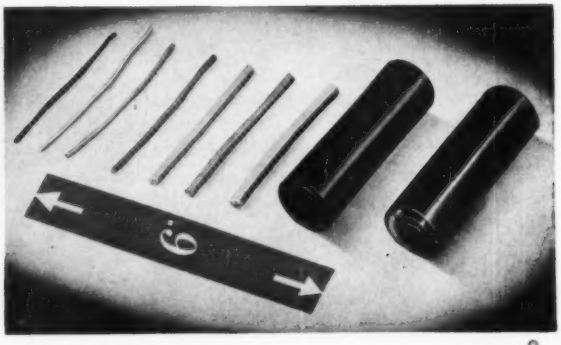


they're made on the "twin-screw"

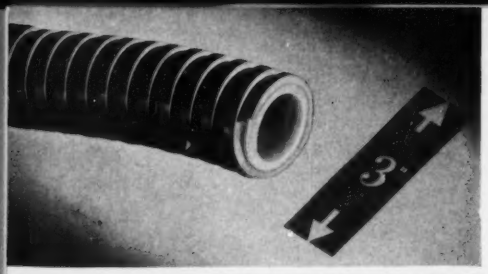
RC-3

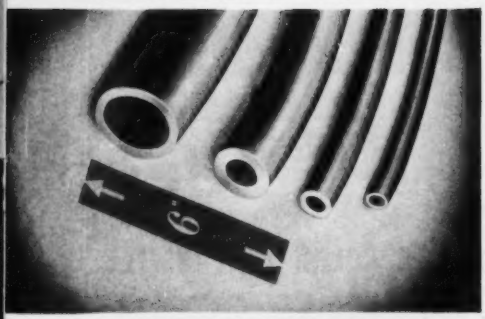


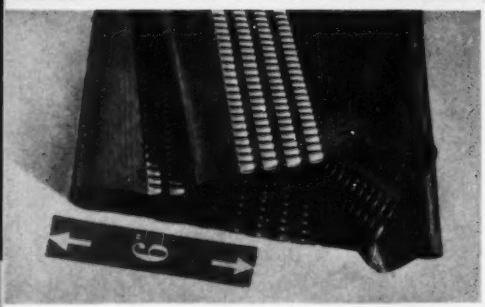
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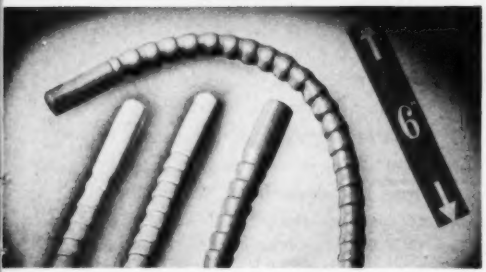


2.









J-C

3. THERE are great new markets for the remarkable extrusions you can make on the versatile RC-3 extruder . . . markets in the chemical and petroleum field, in packaging, in home furnishings, in the furniture and the automotive fields and elsewhere throughout industry.

Look at the pictures. They show typical extrusions that you can produce on RC-3 equipment . . . extrusions you never thought possible heretofore!

4. But that's only part of the RC-3 story. This small machine (it weighs less than a ton and measures only 2'3" x 3'7") has a twin-screw design that makes it a 100%-effective *compounder* and *scrap reclaimer* as well. Hence, it enables you to dispense with many types of expensive single-purpose equipment. It enables you to do *all* your own compounding at *less* than the cost of expensive pre-compounded, pre-colored materials.

5. When you buy RC-3 equipment, you are also buying, *at no extra cost,* all the know-how of its manufacturer, the world's leading authority on the production of specialized crosshead extrusions. Specifically, this equipment will be installed and serviced by our own trained engineering personnel.

Moreover, there will be made available to you at any time subsequent to your purchase, detailed instructions on how to produce multi-colored extrusions, laminated extrusions in sheet or tube form, spiral extrusions and many others. You will get directions and procedures for compounding and coloring all kinds of thermoplastics. And you will be shown how to use rotating crossheads, how to gang up RC-3 machines to make 3, 4, 5, and even 10-color extrusions.

6. Send at once for complete information about the remarkable RC-3.

1. INTERLOCKING TUBING. Flexible airtight tubes for air conditioning and ventilating equipment. Rigid spirals interlock automatically upon extrusion.

2. COVERINGS. CROSS-SECTIONS. Versatile RC-3 covers wire and rigid metal pipe with protective insulation. Also extrudes complex internal divisions.

3. GASOLINE HOSING. Protective shell of hard polyvinyl chloride extruded over core of soft polyvinyl chloride. Extruded in one operation. Flexible.

4. CHEMICAL TUBING. Rigid or flexible. Resistant to most chemicals. Diameter and wall thickness held to extremely accurate tolerances.

5. MULTI-COLOR BELTING. Separate colors (number of colors depends upon number of machines operating through a single crosshead) in widths up to 54".

6. CORRUGATED TUBING. Unusual vinyl extrusion. Extrudable with continuous corrugations, or with straight sections, as illustrated.

Jackson & Church

COMPANY

SAGINAW MICHIGAN

WORK WELL DONE, SINCE '61

R. H. Windsor Ltd.

MANUFACTURERS UNDER I.M.P. PATENTS

16 Finsbury Sq. London E.C. 2 England

UNICOLOR

SAVES YOU 3 to 4 cents PER POUND ON COLORED EXTRUSIONS

NEW MOLECULAR BLENDING PRINCIPLE INSURES COLOR UNIFORMITY FOR STANDARD, SPECIALLY MATCHED, AND APPROVED NEMA COLORS

Profits increase tremendously when you use the newly developed plastics colorant, UNICOLOR, to color your vinyl, polyethylene and Geon* extrusions. UNICOLOR enables you to save by purchasing the lower priced uncolored resin granules which you may color as needed, as uniformly as the manufacturer can . . . and at a saving of from three to four cents per pound.

NO STREAKING, NO BLISTERING, NO BLEEDING

UNICOLOR consists of specially prepared, color saturated resin granules containing all the tested and approved pigments necessary to produce the finished color. After one simple weighing (1 part UNICOLOR to 24 parts uncolored plastic), the UNICOLOR and uncolored plastic are fed into your extruder together. The UNICOLOR granules, having the same chemical characteristics as the resins, fuse and combine with them into a molecular blend, and distribute their color evenly throughout the mass. Hence, you obtain a color-blended, uniform material which doesn't streak or blister upon extrusion, which can be extruded at the same speeds as uncolored plastics, and which can't possibly clog screens because it is completely homogeneous. What's more, as coloring and extrusion are simultaneous, you need never prepare more colored material than you actually will use for the job being run.

NO WAITING FOR COLORS

In addition to making substantial savings, by maintaining a supply of uncolored plastic on hand, plus UNICOLOR in a variety of colors, you avoid waiting for resin suppliers to run the particular color you desire. In standard colors, UNICOLOR can be delivered immediately; special colors can be matched, prepared and delivered quickly.

NO DUST CONTAMINATION

Since UNICOLOR granules are virtually free from flying dust, using them cuts your contamination problem to a bare minimum. You can actually run different colors on two adjacent extruders with no chance of having the color used in one unit deposited on extrusions produced on the other—as frequently happens when other methods of dry coloring are employed. There are never any traces of air-borne coloring matter on extruding machines, take-ups, or other equipment when you do your coloring with UNICOLOR.

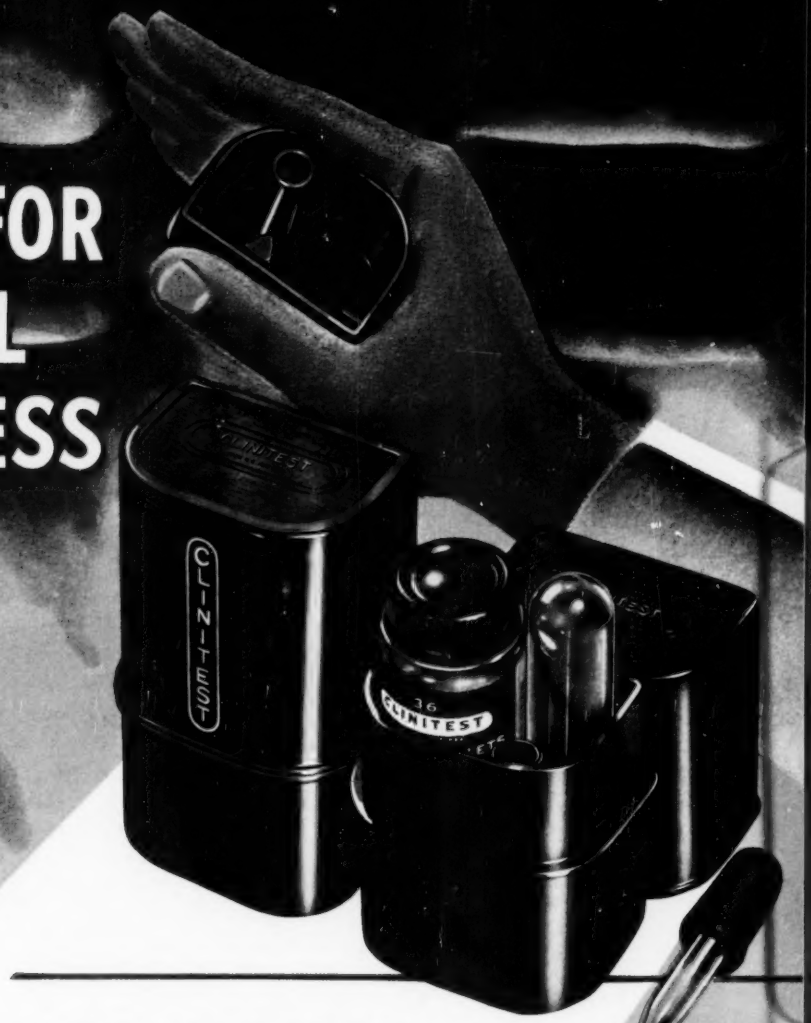
TEST UNICOLOR YOURSELF

Only by testing UNICOLOR in your own extruder can you really tell how simple it is to use, how perfect the results are, how much cheaper it is than buying pre-colored plastics. Address your requests for free samples, details and prices to UNICOLOR DIVISION, Westchester Plastics, Inc., 326 Waverly Avenue, Mamaroneck, New York.

*Reg. Trademark B. F. Goodrich Chem. Co.

Westchester
PLASTICS INC.
CUSTOM COMPOUNDERS OF THERMOPLASTIC MATERIALS

A CASE FOR MEDICAL PROGRESS



The Mills-molded Tenite Plastic case for this Clinitest Sugar-Urine Urinalysis set is truly a case for medical progress . . . for it contains another advancement toward the control of Diabetes. This new method of urinalysis provides the diabetic patient with a simplified method of maintaining a more accurate check on his own condition. The Clinitest is a compact, complete unit in itself and eliminates the heating usually needed for urinalysis. Clinitest literature stresses the durability of its plastic case by stating, "The Clinitest case, made of durable TENITE plastic, will last a lifetime with the proper care." Thus the strength of plastic becomes a definite sales asset to this highly specialized product. This effectiveness is a result of Mills' painstaking production analysis. It is typical of the careful attention given all products molded here. Let Mills' planning do the same effective job for your products. We invite your inquiries.



ELMER E. MILLS CORPORATION

INJECTION MOLDERS and EXTRUDERS of: Tenite, Lumarith, Plastacele, Lucite, Nylon, Ethyl Cellulose, Plexiglas, Polystyrene, Styron, Loalin, Vinylite, Geon, Plexene, Polyethylene, Cerex, Fortical, Chemi-Plastic*, Saran, and other Thermoplastic Materials.

2930 NORTH ASHLAND AVENUE • CHICAGO 13, ILLINOIS

Write on your letterhead for the new Injection Molded and Extruded Plastics catalog. Or, for detailed information about Chemi-Plastic* pipe, tubing and fittings, write for circulars containing data and illustrations.

*Trade Mark Reg.

MPc molded plastics

Makes a good case

FOR THIS RADIO-PHONOGRAPH

BY RCA VICTOR

What made this RCA Victor radio-phonograph an over-the-counter success? First. its two-for-one value ...combining the radio and record player in one neat, compact package. Second, the eye-appeal of its trim, smartly styled design. Third, its more-for-your-money price tag.

In achieving all three of these sales-winning virtues, the **MPc**-molded cabinet played a major part. Molded plastics inexpensively produces the complicated shape needed to house the dual mechanism. Plastics adds color...sleek lines...mold-perfect finish. Ingenious mold design cuts assembly costs by providing molded-in openings for dial and controls, as well as cored studs to take self-tapping assembly screws.

And in this case, the inventive use of plastics can often lift a product above competition. Making plastics perform to *your* commercial advantage is our business, here at **MPc.** Submit your plastics product or problem to MOLDED PRODUCTS CORPORATION, 4535 W. Harrison St., Chicago 24, Ill.



PLASTICS DIVISION
MOLDED MPc PRODUCTS
CORPORATION



Experience proves that TITANOX pigments are your best choice for brightening, whitening, and opacifying plastic compounds for sheets, film coated goods, molded or extruded forms. Available in rutile types which are the most efficient for plastics, these titanium dioxide pigments possess excellent physical and chemical stability. Their opacifying power can be utilized to secure any degree of opacity simply through varying the amount used. In addition, TITANOX pigments contribute to improved resistance to sunlight.

Our Technical Service Laboratory staff will be glad to furnish additional data or help you choose the proper grade of TITANOX for your products. Just telephone or write our nearest office. Titanium Pigment Corporation 111 Broadway, New York 6, N. Y.; 104 So. Michigan Ave., Chicago 3, Ill.; 2600 So. Eastern Ave., Los Angeles 22, Calif. Branches in all other principal cities.

Photos Courtesy of Bakelite Corporation

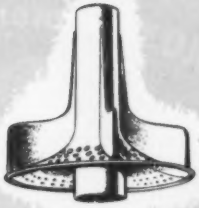
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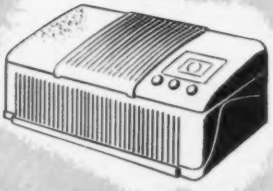
® TITANOX

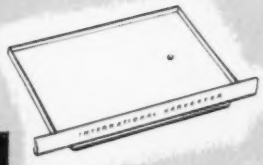
the brightest name in pigments

TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

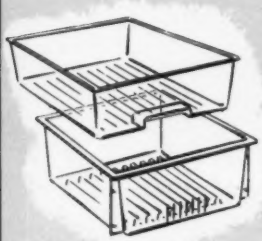






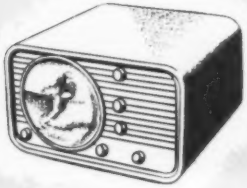
For successful
COMPRESSION
INJECTION
TOOLS and DIES
PAINTING
ASSEMBLY...







See



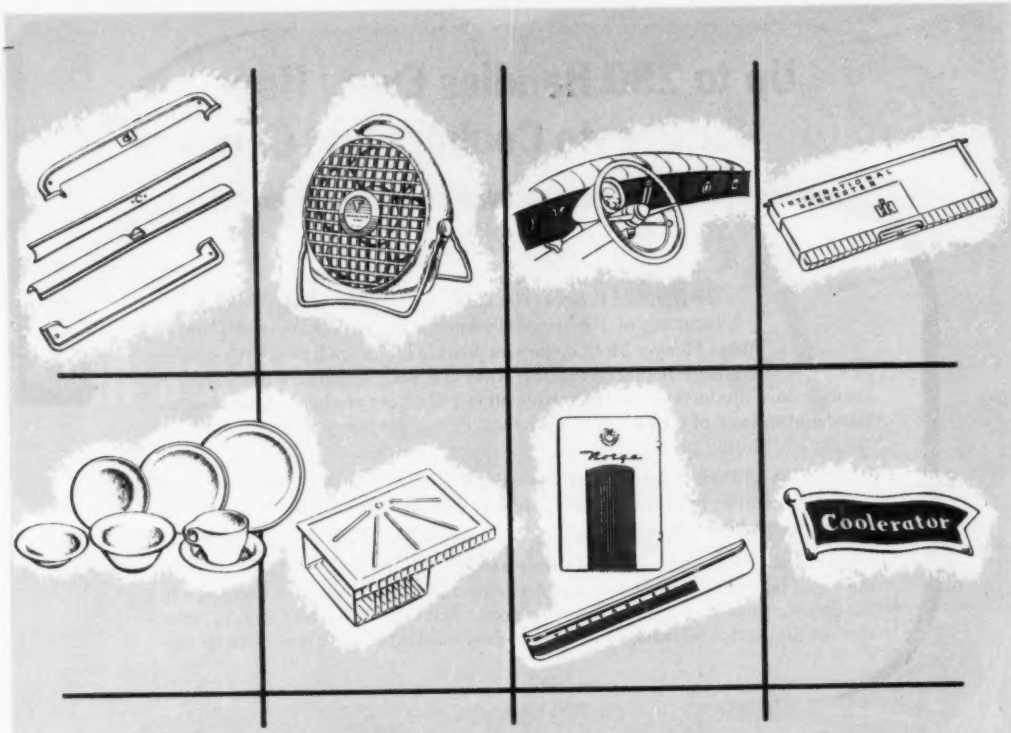
FACILITIES...



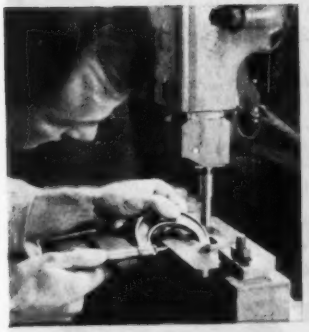
2 oz. to 48 oz. injection presses



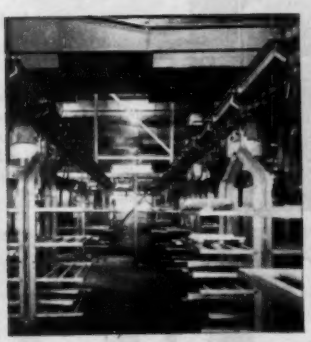
Compression presses up to 2000 tons (with 71" x 74" platen areas)



General American



Complete tool shops



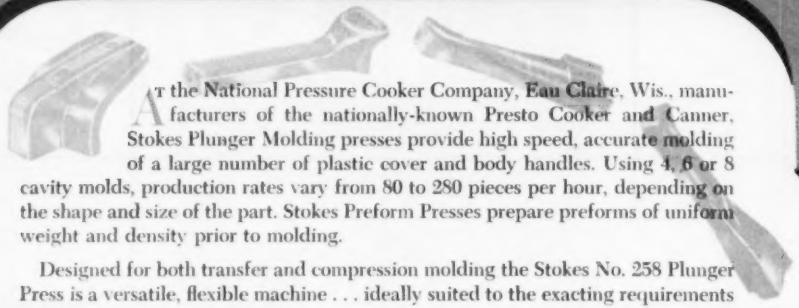
Mechanized painting and assembly

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GENERAL AMERICAN
TRADE MARK

PLASTICS DIVISION
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ASK STOKES

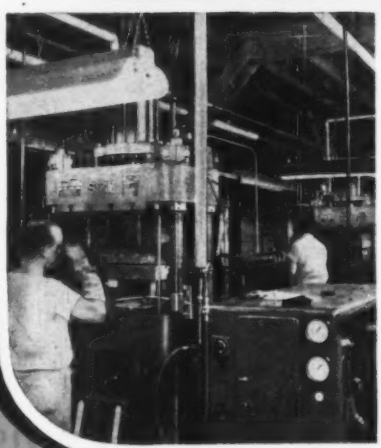
Up to 280 Handles Every Hour for Presto Cookers and Canners



At the National Pressure Cooker Company, Eau Claire, Wis., manufacturers of the nationally-known Presto Cooker and Canner, Stokes Plunger Molding presses provide high speed, accurate molding of a large number of plastic cover and body handles. Using 4, 6 or 8 cavity molds, production rates vary from 80 to 280 pieces per hour, depending on the shape and size of the part. Stokes Preform Presses prepare preforms of uniform weight and density prior to molding.

Designed for both transfer and compression molding the Stokes No. 258 Plunger Press is a versatile, flexible machine . . . ideally suited to the exacting requirements of plunger molding operations.

Such features as rapid, positive toggle action for closing and locking mold . . . improved bar-type control for utmost flexibility and reliable control for all steps in the complete molding cycle . . . compact power unit with high speed rams . . . give distinct production advantages. Molders report substantial labor and material savings, and fewer rejects with the Stokes Plunger Press.



Write NOW for the complete story of the Stokes No. 258 Plunger Press . . . and how it can profitably fit into your production set-up.

F. J. Stokes Machine Co.
5934 Tabor Road
Philadelphia 20, Pa.

Stokes makes Vacuum and Special Processing Equipment, High Vacuum Pumps and Gages, Pharmaceutical Equipment, Industrial Tabletting and Powder Metal Presses, Plastics Molding Presses, Water Stills and many types of Special Machinery.

STOKES KNOWS HOW

informative labeling in action...



1 NATIONAL ADVERTISING by Dow Chemical Co. builds consumer recognition of STYRON name and advantages.



2 INFORMATIVE LABELS at the point of purchase tell and sell the product story to Mrs. America.



3 FOR THIS TIE-IN MERCHANDISING JOB, Dow and Columbus Plastics' Lustro-Ware chose KUM-KLEEN® Labels.

THE 'DISCUSSION DAYS' of informative labeling are over.

Today's competitive selling has spurred plastic manufacturers and molders to action.

Dow Chemical Co. of Midland, Michigan and Columbus Plastics of Columbus, Ohio, as an example, have proved the effectiveness of Kum-Kleen *Informative* Labels. The KUM-KLEEN pressure-sensitive Label is the right label for plastic because it sticks and stays stuck; is easily removable without harmful scraping or tearing—and is applied with production-line speed *at a fraction* of the on-the-product cost of ordinary labels.

When you think of informative labeling in action, think of Kum-Kleen. Write today for Kum-Kleen facts and samples.

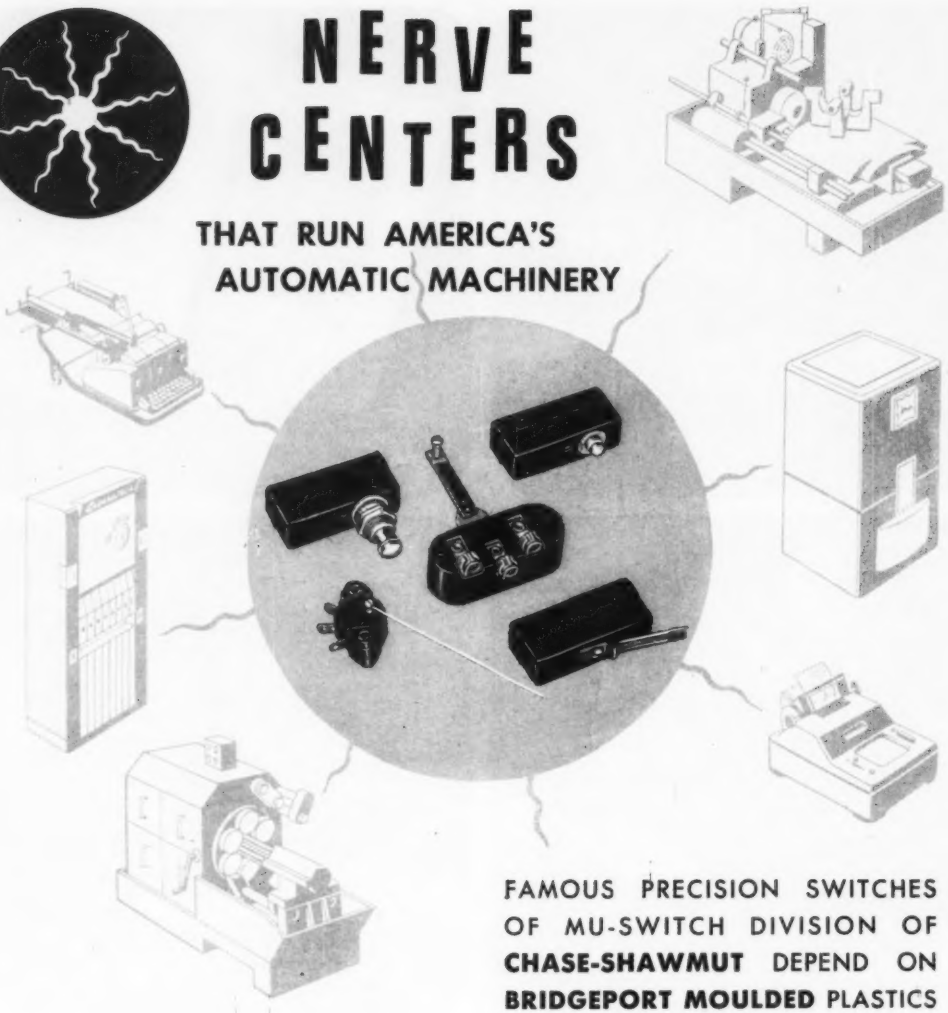
Kum-Kleen®

AVERY ADHESIVE LABEL CORPORATION
Monrovia, California

NEW YORK · PHILADELPHIA · DETROIT · CHICAGO · CLEVELAND · AND ALL PRINCIPAL CITIES

NERVE CENTERS

THAT RUN AMERICA'S AUTOMATIC MACHINERY



FAMOUS PRECISION SWITCHES OF MU-SWITCH DIVISION OF **CHASE-SHAWMUT** DEPEND ON **BRIDGEPORT MOULDED** PLASTICS

The almost human reactions of many of America's finest automatic machines depend on the delicate precision switches made by the Mu-Switch Division of Chase-Shawmut. Rated tops in the Industry, these amazing switches meet the most exacting requirements of controlling business machines, vending machines, machine tools and other automatic machinery in many fields.

The amazing performance of Mu-Switch products owes much to special phenolic and plastic pieces developed by Bridgeport Moulded "plastic engineers" in cooperation with Mu-Switch. Made to meet finest tolerances, lightweight, durable, these plastic pieces help Mu-Switch products lead the field.

Perhaps our "plastic engineers" can help you make a better product. The skill of these specialists, plus our *complete* facilities, can solve *any* problem you may have. Write today.

BRIDGEPORT MOULDED PRODUCTS, INCORPORATED

BOX 3276-O BARNUM STATION BPM BRIDGEPORT 5, CONNECTICUT



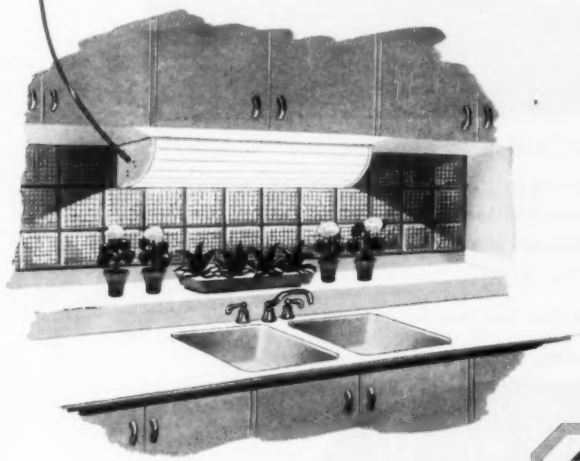
Fluorescent lighting fixture for corner installation between ceiling and wall. Designed especially for Koppers "Moonglow" Polystyrene 8. Manufacturer: Winfield Electric Company, 164 N. Ada Street, Chicago 22, Ill. Extruder: The Anesite Company.

"Moonglow"

Koppers Perfected Plastic for lighting applications

● Lighting fixture makers have long been looking for a way to obtain a soft white light . . . not too bright . . . not too dim . . . but easy on the eyes. Koppers has solved this problem by developing a new transluscent color called "Moonglow," made from Polystyrene 8.

Fixtures designed around the use of "Moonglow" are ideal for offices, industrial plants, bathrooms, kitchens and automobiles. They direct maximum light where you want it without glare.



chief advantages

OF "MOONGLOW" POLYSTYRENE 8

- You can get just the right degree of light transmission and diffusion combined with proper opacity or hiding power. This assures maximum light without showing the tube in fluorescent lights or the filament in incandescent lights.
- High heat distortion temperature, 200°F. assures dimensional stability.
- Light weight results in less weight suspended from ceiling and in lower shipping costs.
- Can be injection molded or extruded in any desired shape and easily cut to proper length. This reduces labor, time, and material costs.
- Flexibility permits shield to be snapped into position, saving assembly time and maintenance time after installation.
- The use of plastic in the shield permits a minimum of metal framing and therefore allows a maximum of light transmission area.

RE-DESIGN FOR LOWER COSTS

The Winfield Electric Company has already redesigned their fixtures to take advantage of the many cost-saving features of Koppers "Moonglow" Polystyrene 8. Why not discuss "Moonglow" with our engineers or write for complete information?

KOPPERS COMPANY, INC.
Chemical Division Pittsburgh 19, Pa.
Regional offices: New York Boston, Chicago and San Francisco

KOPPERS

Koppers *Perfected* Plastics

• POLYSTYRENE • ETHYL CELLULOSE • CELLULOSE ACETATE

Koppers Company, Inc.
Chemical Division, Dept. MP-11
Pittsburgh 19, Pa.

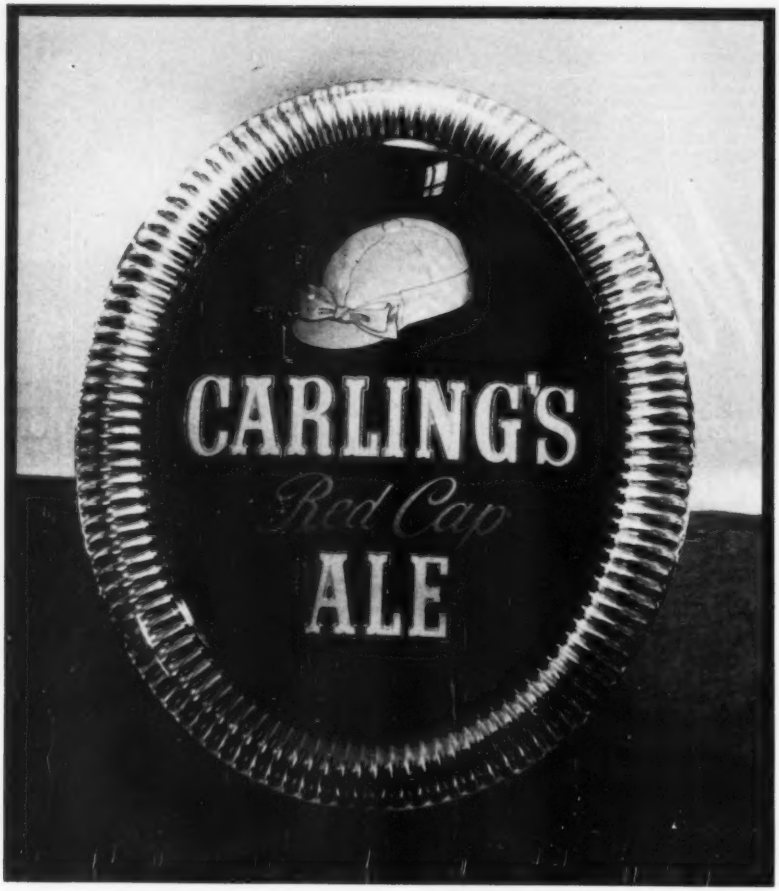
Please send me more information on Koppers "Moonglow" and a sample chip. I am a molder ☐ extruder ☐ other ☐.

Name..... Title.....

Company.....

Address.....

City..... State.....



Creative Custom Molding

Illustrated above is a sign produced for Carling's Ale, distributed by The Brewing Corporation of America, Cleveland, Ohio. This injection molded sign measures 12"x9-7/8". It is made of acrylic material and finished in three colors -- red, green, and bright silver.

"The customer reports that this sign has been an effective point of sale advertising medium."

CRUVER MFG. CO.
Est. 1896
MOLDING • FABRICATING • LAMINATING • FINISHING
"BAS-RELEEF" • DECORATING • ASSEMBLY • SPRAYING
2460 WEST JACKSON BLVD., CHICAGO 12, ILLINOIS
NEW YORK 2 West 46th Street
DETROIT General Motors Building
ST. LOUIS Cotton Belt Building



SURE-SHOT METERING

THE F-L VOLUMETRIC FEED CONTROL

is another refinement which makes a Fellows-Leominster molding machine a sound investment for you. A calibrated setting screw for fine adjustment of plastic feed gives a reliable index for subsequent production runs. It's of particular advantage with finely ground materials. Again, Fellows-Leominster hinges the hopper for simple access to the meter slide for quick cleaning in changing materials. It's only one of many design advantages of F-L "Speed-Flo" molding explained in a bulletin available at our nearest office.

Fellows

LEOMINSTER

injection molding equipment

WANT THE DETAILS ?

Sign below and let us send you the new catalog information

Name_____ Title_____

Company_____

What capacity most interested in?_____ oz._____

Street Address_____

City & State_____

THE FELLOWS GEAR SHAPER CO., Plastics Machine Division. Head Office and Export Dept., Springfield, Vermont. Branch Offices: 616 Fisher Bldg., Detroit 2; 640 West Town Office Bldg., Chicago 12; 7706 Empire State Bldg., New York 1. New England Distributor, Leominster Tool Co., Leominster, Mass.



How Parker-Kalon Helps You

FIT THE FASTENER TO THE JOB

To Reduce Assembly Costs

In designing for lower costs, have you questioned the efficiency of the *fasteners* you use? In 7 out of every 10 cases, Parker-Kalon Self-tapping Screws permit savings up to 50% in assembly work hours.

With P-K Screws, you eliminate such job-slowing operations as tapping, riveting, nut-running, and inserts in plastics. But other big advantages — simplified assemblies, lower production costs, and often improved product performance — lie in Parker-Kalon's ability to *fit the fastener to the job.*

Originators of the Self-tapping Screw, Parker-Kalon can draw upon 35 years experience in solving application problems — more than a million of them. And, with a complete line of Self-tapping Screws for every metal and plastic assembly, Parker-Kalon advice is unbiased.

Today — call in a P-K Assembly Engineer. Find out the possibilities of using this simpler, speedier fastening method in your assembly for cost reduction and improved design. Or, mail assembly details for recommendations. Parker-Kalon Corporation, 200 Varick St., New York 14, N. Y.

Remember
IF IT'S P-K ®
... IT'S O.K.!

The Original **P-K®** **PARKER-KALON®**

SELF-TAPPING SCREWS

FOR EVERY METAL AND PLASTIC ASSEMBLY

Noma Makes News

with "Hercules" Flame-Resistant Acetate





Improved designs combined with the development of a new and superior flame-resistant cellulose acetate provide ultra safety and utility in Noma's new line of illuminated Christmas tree ornaments.

Designed right, and molded with the right plastic, Noma's new "fancy figures" are shaped to give generous clearance around bulbs. Clever venting keeps them cool, contributes to their sparkle and brilliance when lighted. They are approved by Underwriters' Laboratories, Inc. when used in listed outfits.

This new flame-resistant acetate offers all the features of regular cellulose acetate: toughness, rich color, extreme lightweight, good electrical insulation, heat resistance, and dimensional stability, plus the important advantage of being a truly self-extinguishing material which can be injection molded.

"Hercules" flame-resistant acetate is bringing added sales appeal to a growing list of electrical appliances and devices. Our technical staff invites inquiries on improving your products with flame-resistant cellulose acetate.



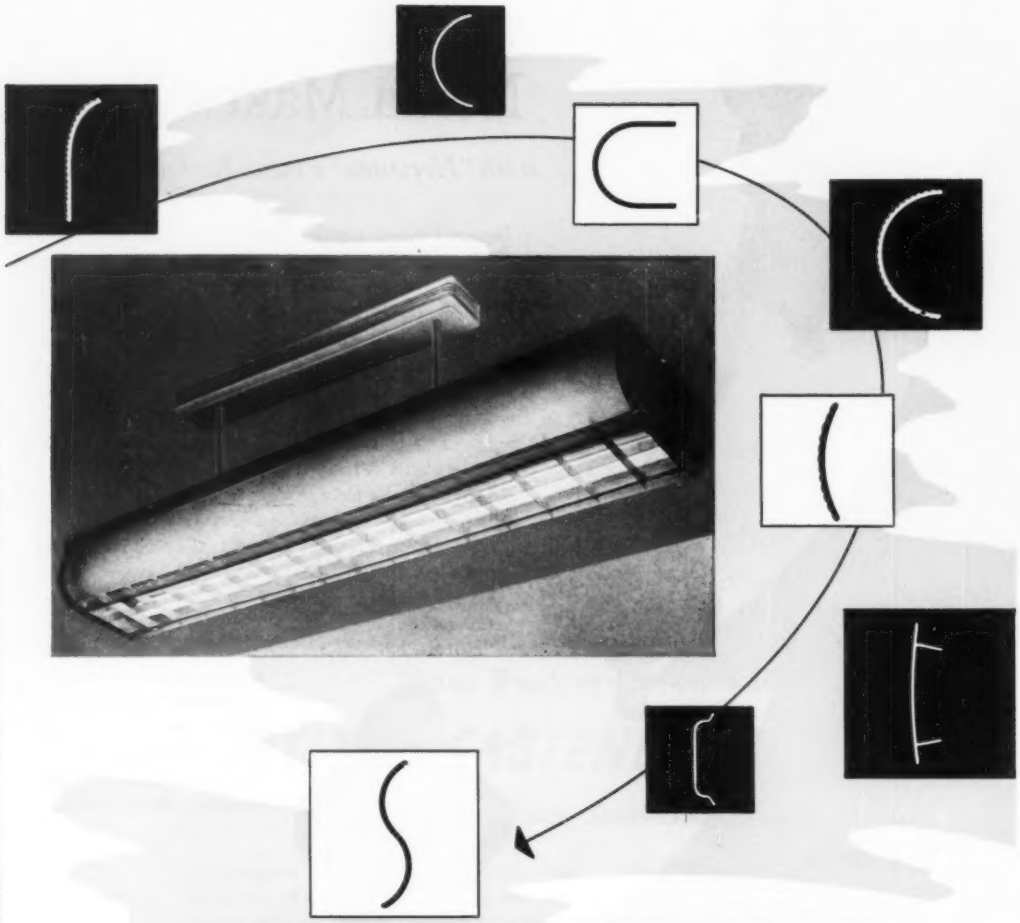
- TOUGH
- COLORFUL
- FLAME-RESISTANT
- LIGHTWEIGHT
- ECONOMICAL





HERCULES POWDER COMPANY
INCORPORATED
916 Market Street, Wilmington 99, Delaware

CP9-7



EXTRUDED PLASTIC PANELS
for Lighting Fixtures

Shown are some of the stock shapes we have available for immediate delivery. We produce them in clear material as well as in various degrees of opacity formulated to your specification.

If you have special requirements, Yardley engineers will design flat or profile sections up to 10" in width.

Yardley extruded plastic panels eliminate breakage troubles, provide more even light diffusion, offer greater versatility in design. Investigate.

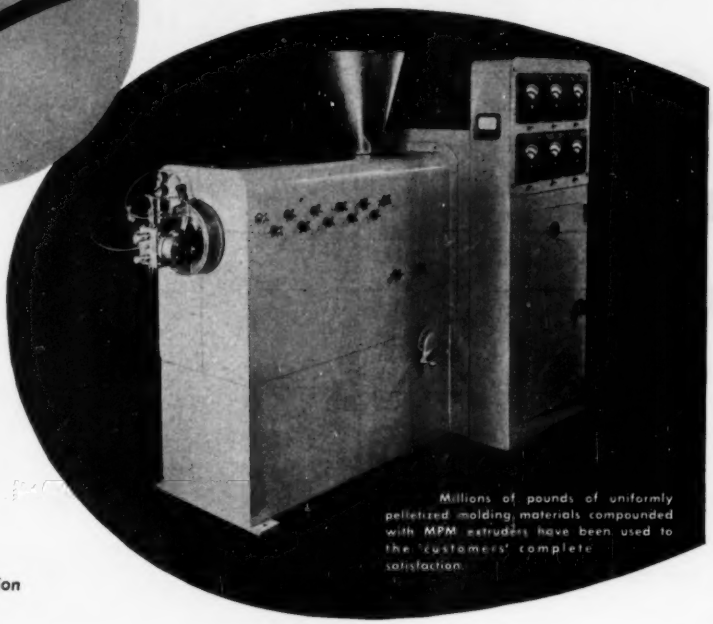
There's an experienced Yardley representative near you.

YARDLEY PLASTICS CO.

142 PARSONS AVE. • ADams 9315 • COLUMBUS 15, OHIO

Compares

MPM EXTRUDERS for COMPOUNDING



Millions of pounds of uniformly pelletized molding materials compounded with MPM extruders have been used to the customers' complete satisfaction.

OUTPUT

(pounds per hour of any thermoplastic now used for molding or extruding)

QUALITY

(density of pellets and color uniformity)

PRICE

(capital outlay versus production capacity)

Users of substantial quantities of molding materials who compound and color their own pellets with MPM extruders and pelletizers find that it puts them in a favorable competitive position. Material inventories can be kept low—only *uncolored* plastic need be stocked. Handling and operating costs are reduced. And *overnight*, molding pellets of any desired color can be prepared.

MPM extruders will produce more material, dollar for dollar, than more complicated or specialized compounding machines. And furthermore, MPM extruders can turn out a wider variety of better quality extruded items, ranging from thin sheet as wide as 100", to rods, wire covering, strips, shapes and the like.

MPM pelletizers cut any thermoplastic material for molding or extruding into uniform cylindrical pellets that feed freely in the smallest or largest machine hoppers. A very minimum or total absence of "fine" particles is achieved.

The MPM equipment for compounding, coloring and pelletizing is extremely flexible. One customer uses three medium size extruders for producing finished rods, tubes, etc. during the day, and at night these machines pelletize materials for use in the injection molding department the following morning.

Since customers' requirements differ somewhat, we suggest you supply us with your production requirements, information about the materials to be compounded or extruded, electric current characteristics, etc. Our reply should convey information to save you time and money.

An Invitation

Ask us to demonstrate exactly what an MPM extruder can do in preparing molding pellets with the materials you use. Only actual trial runs of this sort on all available types of equipment will enable you to compare results from a standpoint of output, quality and price.

modern plastic machinery corp

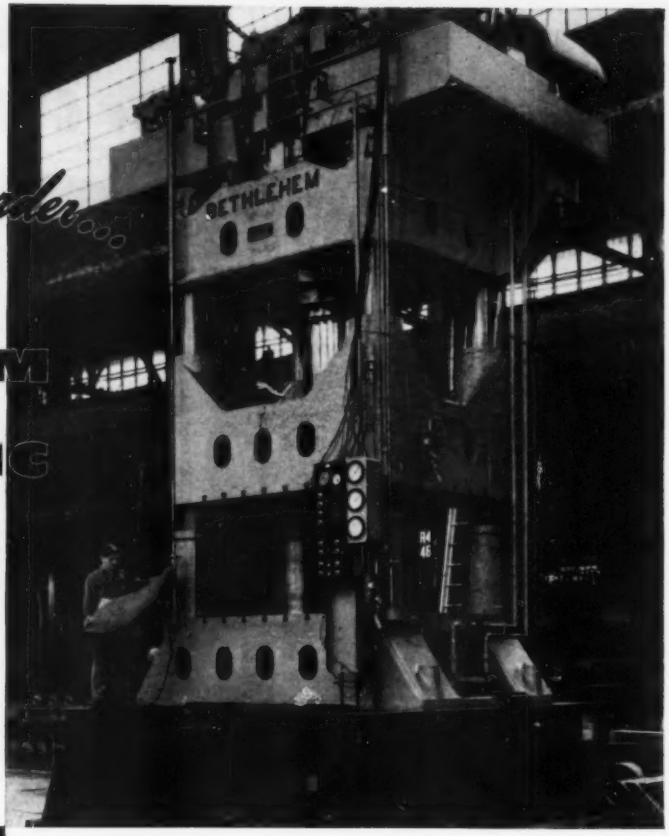
mfm

15 Union St., Lodi, N. J., U. S. A.

Cable Address: MODPLASEX

Built to your order...

BETHLEHEM HYDRAULIC PRESSES





★ BETHLEHEM STEEL ★

BETHLEHEM
Custom-Built
HYDRAULIC PRESSES
FOR
PLASTICS • METAL-FORMING • WALLBOARD
FIBER BOARD • VULCANIZING

Whether you need one press or a whole battery, we are equipped to do a full custom job for you . . . make the steel, do all the necessary forging, casting, machining, assembling, etc. We are not limited to a narrow range of sizes; on the contrary, our facilities enable us to produce both large and small units, and any size in between.

If the customer so specifies, his Bethlehem press can be furnished with self-contained or separate hydraulic power system, plus any desired accessories.

One of our engineers—a specialist in this field—will be glad to talk over your future requirements with you. Call him in; he's available whenever you need him. No obligation, of course.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

DRAWING BOARD BLUES?



Cheer-up! KYS-ITE Will Brighten the Picture!

That piece or part that's bothering you! Have you considered designing it in Kys-ite?

Kys-ite is a most unusual material. It combines lightness and strength . . . has excellent dielectric properties . . . offers a broad range of integral colors with permanent lustrous finishes. Even engineers comment on Kys-ite's amazing impact strength . . . up to 5 times that of any other plastic! And versatile! Kys-ite can be machined, drilled, decorated or worked to close tolerances. It resists abrasion, chipping, warping and corrosion. It can be used for long pieces, odd shapes, thin walled sections or hollow forms!

In short, Kys-ite is "tops" . . . one plastic that will please your engineers and customers as well.

Keyes Fibre Company offers a complete service —compression molding to *your* specifications along with delivery of the finished product and component parts.

Write today . . . and "write off" that plastic problem with Kys-ite!

This partial list of finished articles and component parts molded of KYS-ITE may suggest how you, too, can improve your product.



It costs nothing to find out if KYS-ITE is just what you're looking for. Write today, no obligation.

KYS-ITE

Reg. U.S. Pat. Off.

KEYES MOLDED PRODUCTS

KEYES FIBRE COMPANY
420 Lexington Ave., New York 17, N. Y.
Plant at Waterville, Maine

PREFORMED PLASTIC COMBINING LONG FIBERED WOOD PULP AND SYNTHETIC RESINS

Loyalty—

...and how it may be bought

One of the most admirable of all human attributes is that one known as "loyalty". It transcends nearly all other characteristics. It is an essential quality of those upon whose shoulders has been placed the mantle of leadership. For, to be loyal is to be constantly faithful to a trust or confidence. And that too is a penalty of leadership.

Loyalty is as tangible a part of the merchandise made by those leaders as are the materials, men and machines that make it.

It is that element which contributes so large a measure to inherent goodness . . . that distinguishes a man; an organization or a product from the average; the mediocre; the expedient.

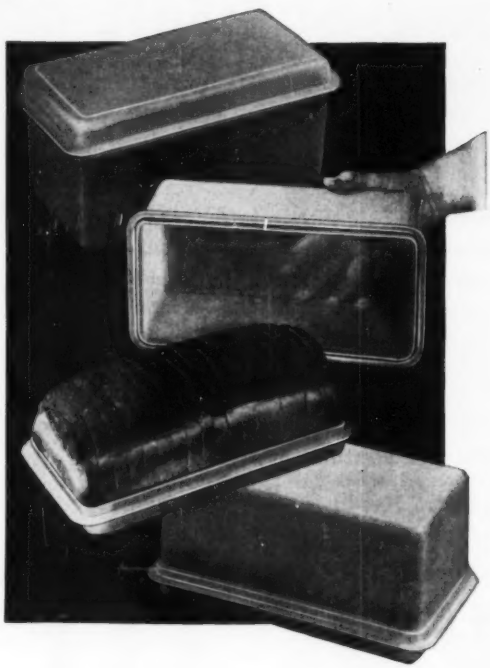
Fortunately loyalty may be bought . . . not in terms of dollars and cents; not as one would buy from the glib-tongued hawkers in the bazaars or at the shrill insistence of the itinerant vendor, but from those who know its meaning and, being loyalty-conscious, imbue their products with that inherent goodness.

The customers of the Tupper Corporation buy that element of loyalty as an essential ingredient of every Tupper product made, whether for general sale or for association with others of similar worth.

No Tupper product is ever made until it has been subjected to thoughtful consideration and deliberate contemplation of the service it must render . . . that it may perform that function in a manner that is wholly satisfactory.

That is loyalty and this is how you may buy it.

TUPPER



The Tupperware Bread Server, most recent of Tupper developments, represents another successful acceptance of the challenge to straight-thinking, ingenuity and loyalty to principle to which leadership is subject.

For, here is the first receptacle devised of which it may be said positively that it will retain the freshness of the sliced commercial loaf of bread, since home bread baking became lost to the American scene.

Observe that the identical principle, conceived and made available in the form of Tupper Seal, flexible, air and liquid-tight covers has been employed in this design, to exclude air, resist humidity, insects and vermin . . . to function as a storage container and occupy a place of distinction in a smart table setting.

TUPPER!

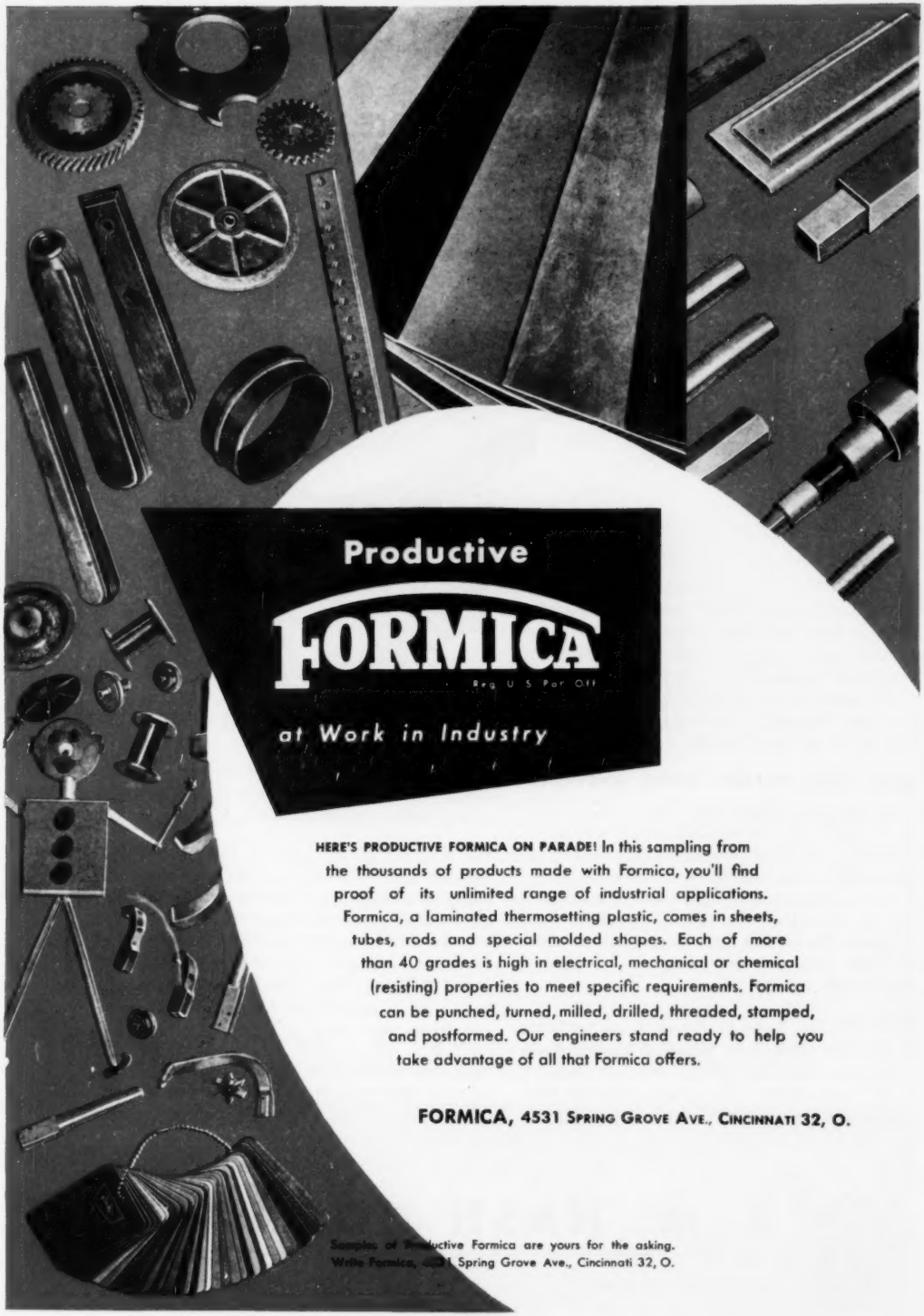
TUPPER CORPORATION

Manufacturers of — CONSUMER, INDUSTRIAL, PACKAGING AND SCIENTIFIC PRODUCTS

FACTORIES: Farnumsville, Mass., and Cuero, Texas — New York Show Rooms 225 Fifth Ave.

ADDRESS ALL COMMUNICATIONS TO: Department B

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Productive

FORMICA

Reg U S Pat Off

at Work in Industry

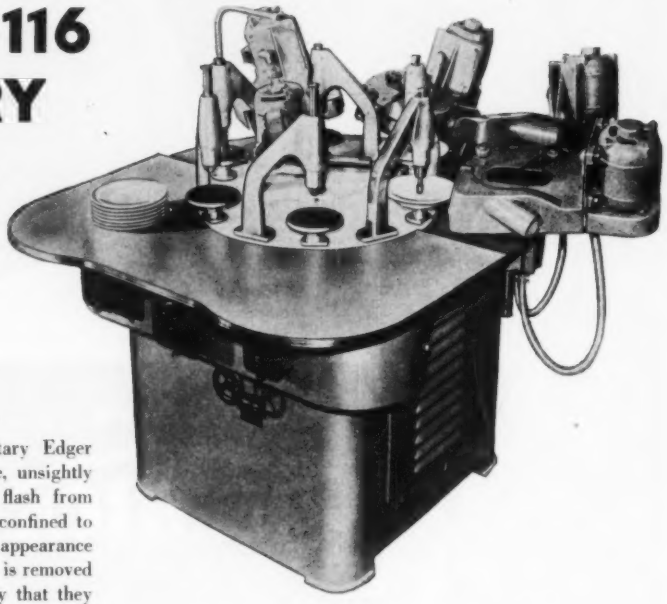
HERE'S PRODUCTIVE FORMICA ON PARADE! In this sampling from the thousands of products made with Formica, you'll find proof of its unlimited range of industrial applications. Formica, a laminated thermosetting plastic, comes in sheets, tubes, rods and special molded shapes. Each of more than 40 grades is high in electrical, mechanical or chemical (resisting) properties to meet specific requirements. Formica can be punched, turned, milled, drilled, threaded, stamped, and postformed. Our engineers stand ready to help you take advantage of all that Formica offers.

FORMICA, 4531 SPRING GROVE AVE., CINCINNATI 32, O.

Samples of Productive Formica are yours for the asking. Write Formica, 4531 Spring Grove Ave., Cincinnati 32, O.

DEFLASH and POLISH your CIRCULAR MOLDINGS FASTER, BETTER than ever before...AUTOMATICALLY

on the NASH-116 ROTARY EDGER



That's right! . . . The Nash-116 Rotary Edger allows you to say goodbye to expensive, unsightly abrasive wheel and hand removal of flash from circular molded pieces. Its operation is confined to a minimum line, maintaining the surface appearance of the moldings. Automatically, the flash is removed and flash scars are polished so perfectly that they become all but imperceptible.

HOW THE ROTARY EDGER OPERATES

Four high-speed abrasive belts plus a buffing wheel do the work. They are mounted around a turntable containing six sets of spindles. Moldings placed on the spindles rotate and, as the turntable slowly revolves, are brought into contact with each abrasive belt in turn. The belts have progressively finer abrasives. The last belt is wax-impregnated to blend the flash scars, and the buffing wheel imparts a final polish.

Hand fed, the Nash-116 Rotary Edger perfectly finishes 8 to 24 pieces per minute. It handles plastic dinnerware and other circular moldings from 3″ to 11″ in diameter. The proper combination of spindle speed and turntable speed (both easily adjustable) is determined by the amount of flash removal desired. The position at which you set the universally mounted abrasive belts permits accurate control of the finished diameter.

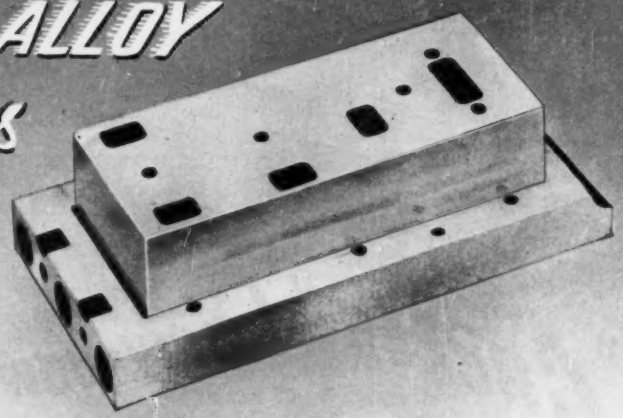
The Nash-116 Rotary Edger is easy to use. By speeding and standardizing your flash removal, buffing and polishing, it enables you to produce more uniform, better finished pieces at considerably less than usual per-unit cost. Aside from the consideration of improved product appearance, the Nash-116 Rotary Edger should save you enough in reduced labor overhead to be written off in a remarkably short while.

Your inquiry will receive prompt attention. Write to us for engineering details and price data without delay.

J. M. NASH COMPANY

2369 NORTH 30th STREET • MILWAUKEE 10, WISCONSIN

"Smooth as Satin" molds readily achieved with SPEED ALLOY Plates



Typical of the favorable comments being made concerning *Speed Alloy* hot rolled alloy steel plates — the new Holliday Speed Steel—is the report of the W-L Molding Co., Kalamazoo, Mich. One of eight cores for an eight cavity plastic mold made by this firm is shown. They are highly enthusiastic over the ease of machining and hardenability of *Speed Alloy*.

"The cavities were hobbed. Machinability was good. Parts came out of carburizing treatment with 56-58 Rockwell C surface hardness and no change in size or shape of the parts. Wall thickness in the thinnest section, between oblong slot and outside wall is .045". This thin wall remained perfectly straight. The cores were readily polished to a mirror finish."

Speed Alloy bridges the gap between carbon and tool steels. The chromium and molybdenum content assure deep hardening properties. Plates available from stock to 72" wide and thicknesses up to 6". Send for Bulletin 905.

SINCE 1856

W. J. HOLLIDAY & CO.
(INC.)

SPEED STEEL PLATE DIV.
137th & Sheffield Ave., Hammond, Indiana
Plants: Hammond and Indianapolis, Indiana
DISTRIBUTED BY

Beals, McCarthy & Rogers, Buffalo, N. Y.
Brown-Wales Co., Boston - Hartford - Lewiston, Me.
Bridgeport Steel Co., Bridgeport, Conn.
Berger Iron Co., Akron, Ohio
Grammer, Dempsey & Hudson, Inc., Newark, N. J.
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"CUBEE'S" know-how...

STARTS AT THE DRAWING BOARD

When it comes to plastics, "Cubee" knows all the answers—and that know-how starts at our drawing board. This business is like an infant in many ways—the first step is the toughest. That first step is the drawing board. There we design the molds which are made in our plant. We control the job from start to finish. If your problem calls for molded plastic parts—call "Cubee." We admit we can't answer *all* your problems. But, if your problem concerns plastics—well, that's something we *do* know!

Q-B Says:

"When your problem is plastics
Don't Lose your shirt
Remember that old adage,
'Consult an Expert'!"



QUINN-BERRY CORP.
26511 West 12th Street
ERIE, PENNSYLVANIA



Branch Offices

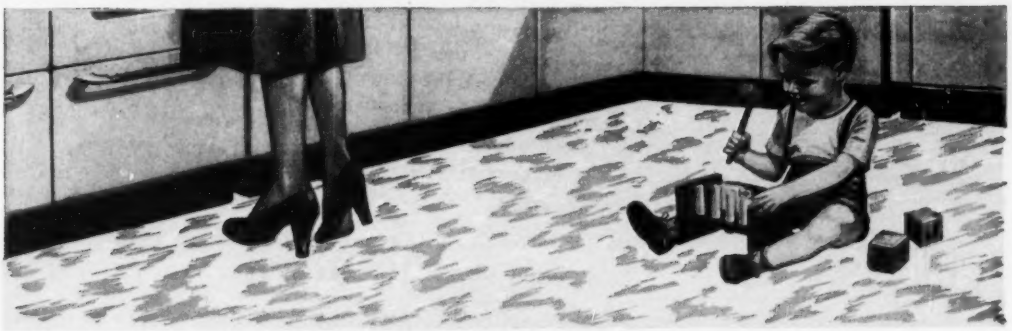
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PARAGON SALES COMPANY
111 S. 22nd Street
Philadelphia 3, Pennsylvania



Low volatility saves you dollars in processing



. . . and KEEPS your product looking like new

From calender rolls to consumer, and long after . . . FLEXOL plasticizer TWS *stays in* vinyl resins. Even less volatile than tricresyl phosphate, TWS cuts costly plasticizer losses in hot processing and in use . . . *keeps on* plasticizing your product over a longer useful life.

Calendering compounds containing TWS process smoothly. In vinyl extrusion compounds, TWS gives smooth surfaces at high production rates.

TWS is a general purpose plasticizer. Its good low temperature characteristics and excellent resistance to water extraction (see table) assure product performance that wins and keeps satisfied users.

Write or call the nearest CARBIDE office for samples and recently developed information on how to use FLEXOL plasticizer TWS.

Performance in* VINYLITE *Resin* VYNW *(35% TWS)

Tensile strength, psi	3,200
Ultimate elongation	290%
Elongation at 1,000 psi	75%
Plasticizer loss in 10 days from 0.004″ film:	
Air, 60°C.	0.3%
Water, 25°C.	0.0% ←
Mineral oil, 25°C.	12%
Brittle temperature	−24°C. ←

"Flexol" and "Vinylite" are registered trade-marks of C&CCC.

CARBIDE and CARBON
CHEMICALS CORPORATION
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.



Offices in Principal Cities
In Canada:
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THE CARVER LABORATORY PRESS

Standard for Research and Development

Recognized as standard for plastics research and development, the Carver Laboratory Press is used throughout the world. "One of the most useful pieces of equipment any laboratory can have." In these words a user sums up the variety of services performed by the Carver Press.

If you have a laboratory, small or large, you have many potential uses for this Press. One of its money saving features is the range of Carver Standard Accessories available as optional equipment.

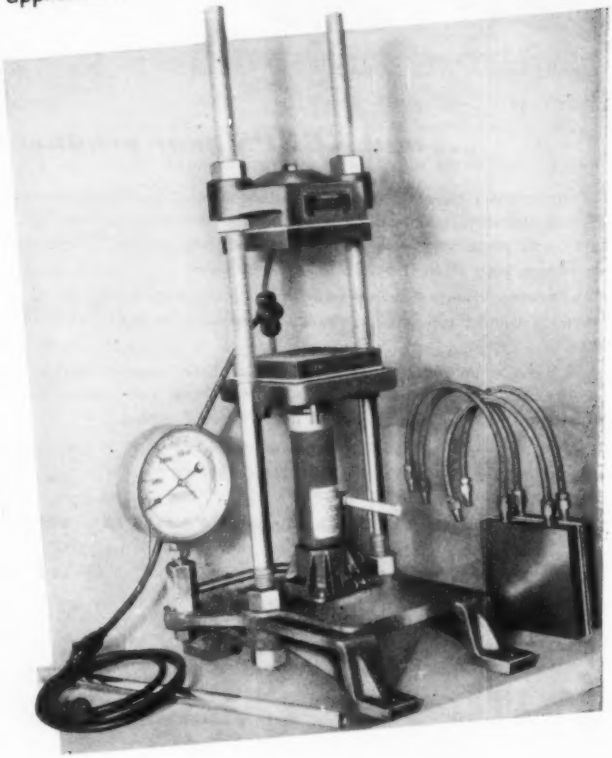
Send today for latest Catalog. It illustrates the Press and accessories and describes some of the general applications.

CLP's in Plastics Laboratories

SOME OF THE MANY USES

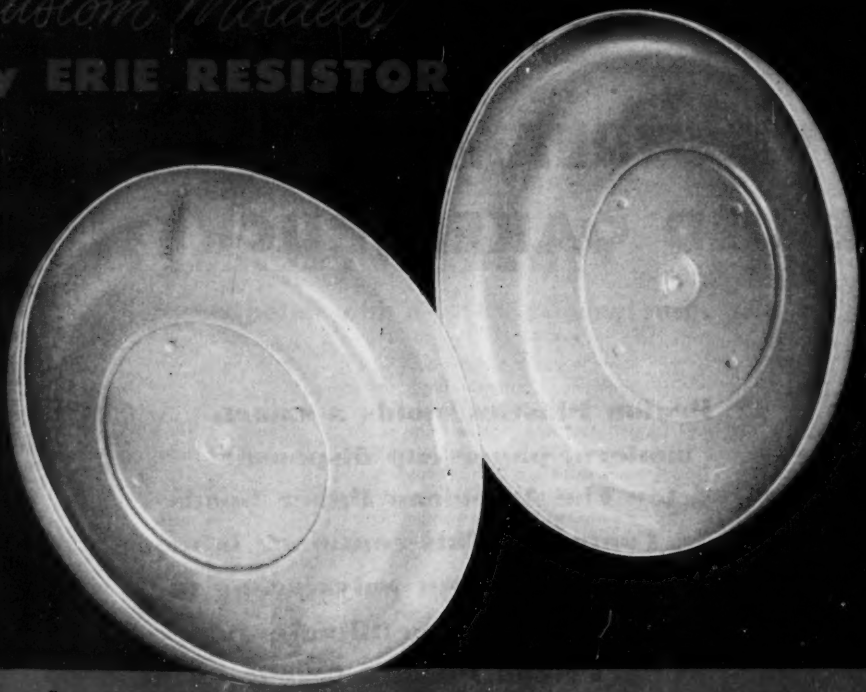
Testing single-cavity molds.
Molding color samples
Production of samples.
Plastics instruction and demonstration.
Metallographic mounting.
Metal insert mold tests.
Vulcanizing.
Drawing.
Forming.
Embossing.
Bonding plywood.
Testing tensile properties.
Testing compressive properties.
Testing shear strength.
Flow tests.
Crushing tests.
Breaking tests.
Determining heat cycles.

The Carver Press provides complete range of temperatures from room temperature to 400° F. Adjustable by thermoswitch to within plus or minus 2° F. Equipped with accurate 6" gauge that provides load readings up to 20,000 lbs. Low pressure gauges optional. Carver Standard Accessories include Electric or Steam Hot Plates; Electrically Heated and Water Cooled Hot Plates; Carver Test Cylinders; Swivel Bearing plates; Cage Equipment, etc.



FRED S. CARVER INC.
HYDRAULIC EQUIPMENT
343 HUDSON ST. NEW YORK 14, N. Y.

Custom Molded
by ERIE RESISTOR



"Better Sight from a Better Light"
WITH TRANSLUCENT PLASTIC DIFFUSER



The new Ritter "Ful-Vue" is planned to give the dentist ample, non-glare illumination over the entire working area, together with a strong operating light focused on the patient's oral cavity.

The shield, which houses circline fluorescent tubes, consists of two shallow bowls, each 13 9/16" in diameter, and identical except for the interlocking edges. They are made of white translucent polystyrene.

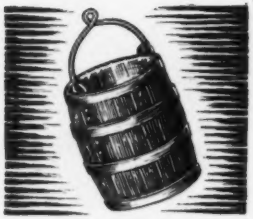
Every shield is subjected to a constant illuminated inspection in use, which means that it must be free of strains, flow marks, air bubbles, or other visual imperfections; that warpage and shrinkage must be under strict control so that the two halves may accurately match and that parts may be freely interchangeable.

In short, it's the sort of job that Erie Resistor likes and the sort of execution that the customer appreciates.

Plastics Division

ERIE RESISTOR CORP., ERIE, PA.

LONDON, ENGLAND • • TORONTO, CANADA



WE'VE STREAMLINED THE OLD OAKEN BUCKET!



Prolon Plastics molds a smart, modern, paper cup dispenser for The American Paper Goods Company. This container is made of translucent polystyrene to show when refilling is necessary. Prolon Plastics is brimful of ideas for making more saleable products! Better moldings and better service can make yours a better product, too.

For better quality, better service, write to

PROLON PLASTICS

COMPLETE CUSTOM MOLDING SERVICE

Research • Design • Engineering • Die Making

COMPRESSION AND INJECTION

A Division of Pro-phy-lac-tic Brush Company, Florence, Mass.



Marvinol's extra toughness and dryness make plastics products more durable and pleasant to touch.

Superior dimensional stability makes Marvinol ideal in products that must not shrink.

In products that must resist chemical and abrasive action, Marvinol fortifies against oils, acids, wear, tear.

NEW THINGS IN PLASTICS

...faster, better with Marvinol® vinyl resin



Marvinol's superior flexibility in low temperatures pays off in products subjected to severe exposure and cold weather.

If your product is one of these basic plastic shapes... one made from them, or even one that has possibilities for manufacturing from plastics, you'll find production time-savings and extra quality in using Marvinol vinyl resin. To improve your product test this remarkable vinyl polymer.

SEE WHAT Marvinol OFFERS YOU



Processors find Marvinol a big time-saver because of its shorter pre-mix; open mill and Banbury cycles.



Extruders of wire products, tubing, belting and other continuous cross-sectional shapes benefit from Marvinol's faster extrusion.



Marvinol may be extruded, calendered, injection molded, made into dispersions for casting film, spreading on fabric and slush molding.



Field engineers and customer research laboratories provide helpful technical service to Marvinol vinyl resin users.

THE ENTIRE EFFORTS of our modern development laboratories are for our customers' benefit. All the formulation, compounding and processing information developed here is at your disposal since it is only through you that Marvinol-based products reach the consumer market. Write to Chemicals Division, Dept. M-11, THE GLENN L. MARTIN COMPANY, BALTIMORE 3, MD.

Martin®

RESINS, PLASTICIZERS AND STABILIZERS PRODUCED BY THE CHEMICALS DIVISION OF

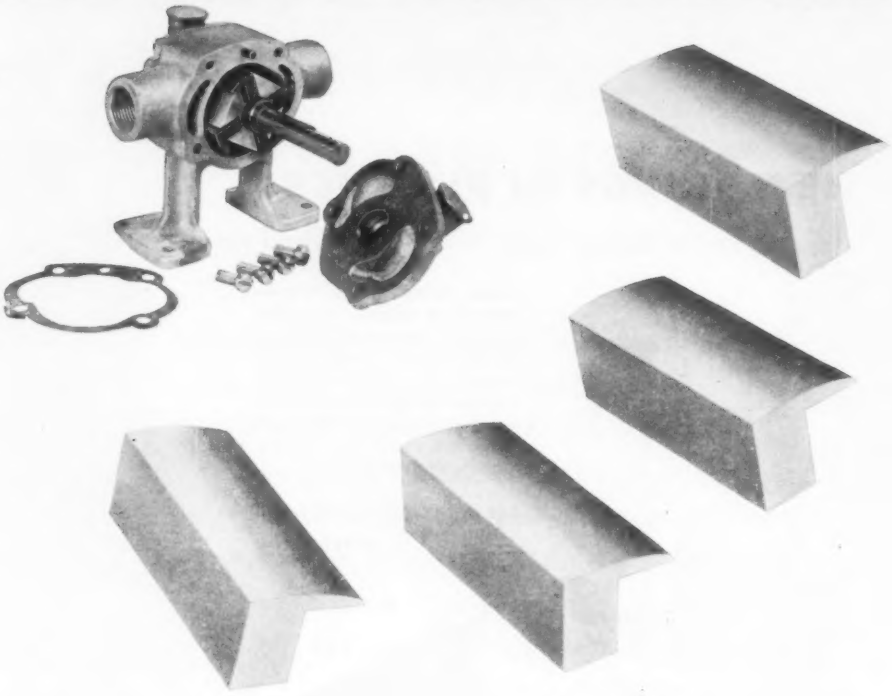
Marvinol®

THE GLENN L. MARTIN COMPANY • AN INTERNATIONAL INSTITUTION

"BETTER PRODUCTS, GREATER PROGRESS, ARE MADE BY MARTIN"

MANUFACTURERS OF: Dependable Martin 2-0-2 airliners • Advanced military aircraft • Revolutionary rockets and missiles • Electronic fire control systems • Versatile Marvinol resins (Martin Chemicals Div.) • **DEVELOPERS OF:** Mareng fuel tanks (licensed to U. S. Rubber Co.) • Stratovision aerial rebroadcasting (in conjunction with Westinghouse Electric Corp.) • Honeycomb construction material (licensed to U. S. Plywood Corp.) • New type hydraulic automotive and aircraft brake • Permanent fabric flameproofing • **LEADERS IN RESEARCH** to guard the peace, build better living in far-reaching fields.

Perfection for Perfection!



Perfection Manufacturing Company of Minneapolis needed special pump vanes to adapt their pump to equipment for spraying insecticides and weed eradicators. They brought their problem to Mincor and found the answer.

Injection molding of the part, using nylon material, proved to be the solution of their problem.

Close tolerances, extreme durability and resistance to a wide variety of chemicals and solvents all added up to "perfection for PERFECTION."

Let Mincor engineers work out *your* problem.

INJECTION MOLDING
MINCOR
"YOUR PLASTICS DEPARTMENT"

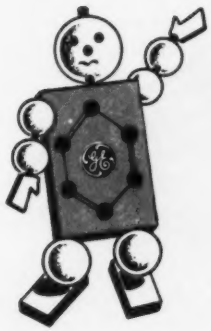
MINNESOTA PLASTICS CORP.

366 WACOUTA • ST. PAUL 1, MINN.

NOW MOLDERS CAN OBTAIN

FAST-CURING

GENERAL-PURPOSE MOLDING COMPOUNDS



NEW GENERAL ELECTRIC POWDERS GIVE YOU:

HERE'S PROOF!

Look at these actual examples of shortened curing times obtained with G.E.'s fast-curing compounds (details on request).



Flatiron handle. . . . cured in 30 seconds.

Lighting fixture . . . . cured in 15 seconds (reduced from 30 seconds).

Cover plate . . . . . cured in 30 seconds (reduced from 90 seconds).



Luggage handle. . . . cured in 40 seconds (reduced from 75 seconds).

Commutator . . . . . cured in 35 seconds (reduced from 45 seconds).



Wall plate. . . . . cured in 15 seconds.

How can these new fast-curing compounds cut *your* schedules, increase *your* production, build *your* profits?

1 Increased production. Production increases up to 25%, resulting from shorter curing times, have been realized by using these compounds.

2 Lower cost per part. Because curing times are reduced compared with present powders, these new compounds give molders lower costs per part.

3 More parts per pound. The low specific gravity of these new compounds means more molded parts per pound of material.

4 The benefits of high-speed automatic molding. A specific granulation makes these compounds exceptionally well suited for high-speed automatic molding operations.

These new General Electric phenolic compounds were developed to meet the need of wiring device manufacturers for a fast-curing molding material for such products as cube taps and outlets. Find out how you may turn out parts of superior finish while increasing production and lowering costs.

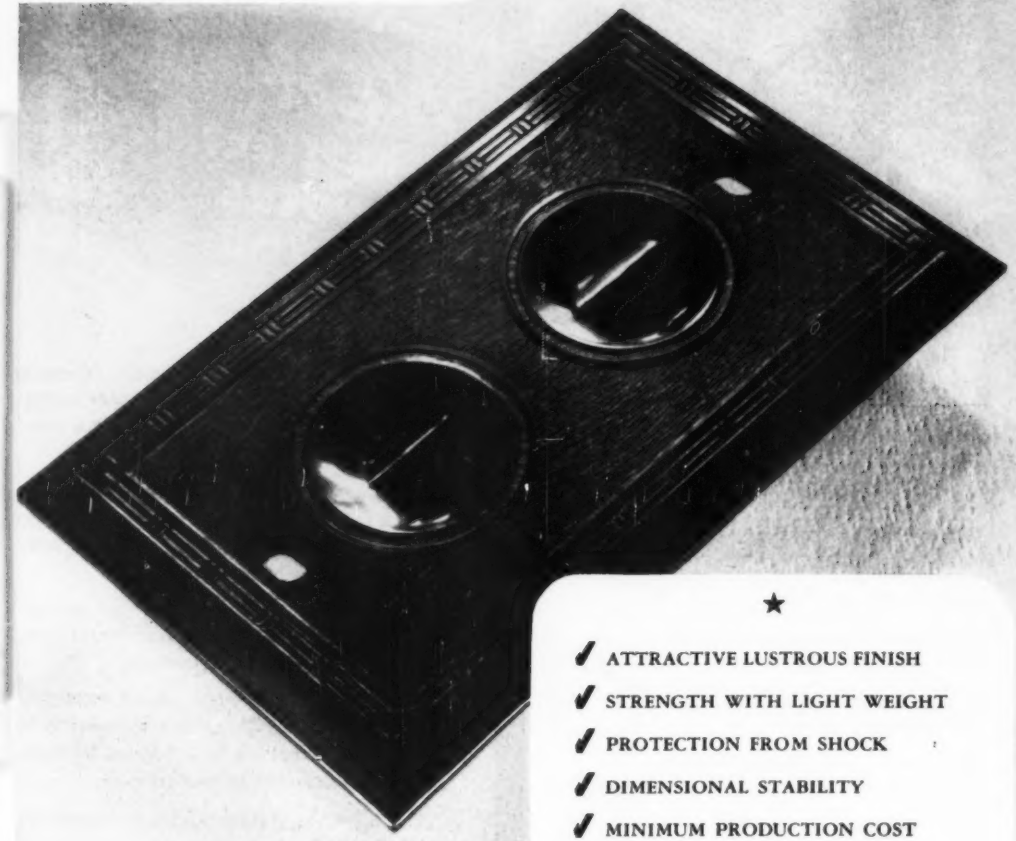
WRITE TODAY for data sheets and free samples to Section 38-11, Chemical Department, General Electric Company, Pittsfield, Mass.

You can put your confidence in—

GENERAL ELECTRIC

CD49-88

DURITE



★

- ATTRACTIVE LUSTROUS FINISH
- STRENGTH WITH LIGHT WEIGHT
- PROTECTION FROM SHOCK
- DIMENSIONAL STABILITY
- MINIMUM PRODUCTION COST

These are a few of the important features that lend character to well designed wall plates when molded of DURITE Phenolic Compounds

THE BORDEN COMPANY
Chemical Division
350 MADISON AVENUE, NEW YORK 17, N. Y.

for small plastic moldings



WINDSOR 4 OUNCE INJECTION MOLDING MACHINE

As many as 3 cycles per minute

A built-for work unit, with a high plasticizing capacity to insure maximum production, is yours when you select the Windsor 4-Ounce Injection Molding Machine. Constructed of highest quality machined alloys, steels and precision castings, it features automatic cycling for fast, economical molding of all thermoplastics, with manual cycle controls available for special purposes.

The hydraulic system, powered by a 15 hp electric motor and a Vickers Balanced Vane Pump delivers 150 tons of evenly distributed clamping pressure and a total injection pressure of 44,000 pounds. Heat is provided by an external heater of 2500 watts, a nozzle heater of 100 watts and an internal heater of 250 watts. Important, too, all parts are accessible for easy maintenance.

Before you order *any* molding machine, check the complete R. H. Windsor line for top-notch molding performance and operating economy. Made by one of the world's largest manufacturers of injection molding equipment, they are available in 2, 3, 4, 6, 8, 12, 16 and 20-ounce shot capacities. *Write for full details.*

SPECIFICATIONS

WINDSOR 4-OUNCE INJECTION MOLDING MACHINE

Die locking pressure	150 tons
Maximum molded	40 sq. in
Plasticizing capacity	25-35 lbs. per hour (approx.)
Pressure on material	13,850 lbs. psi
Mold opens	9½"
Shots per hour	180 (max.)
Ounces molded per shot	4
Main motor	15 h.p.
Locking mechanism	multileaved toggle
Weight	3 tons (net)
Floor space	12'6" x 3'

R. H. Windsor Ltd.

16 Finsbury Square, London, E.C. 2, England Cables TECHNIMACH, LONDON

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MODEL "67"



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COMPACT (27" x 34" Floor Area)

HEATABILITY 6 to 7 Pounds in 1 Minute

Model "67" is a result of several years engineering and development in plastic preheating equipment. Designed to handle large or small loads of compound either as a general purpose preheater or on multi-cavity compression jobs where a loading board can be used to advantage. A new high in operating performance and efficiency is attained by this unit, the latest offering of THERMALL engineering.

"GUARANTEED PERFORMANCE — *or it doesn't cost you a cent"*

Check These Specifications of the THERMALL "67"

WIDTH	34 inches
DEPTH	27 inches
HEIGHT	56 inches
WORK LEVEL	32 inches
WEIGHT	1000 pounds

CONSTRUCTION: Angle steel frame encased with heavy gauge sheet, equipped with heavy duty rubber wheel swivel casters. Finish: Durable gray wrinkle paint.

POWER REQUIRED: 220 volts, or 440 volts, 60 cycle, 3 phase, A.C. (Specify on your order.)

REGULATED FILAMENT VOLTAGE

POWER TUBES: 2 — #25X THERMALL.

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ARRANGE TO SEE THE "67" PERFORM

10 REASONS WHY THE THERMALL "67" CAN HELP INCREASE YOUR PROFITS

1. Cuts Your Molding Time 50% — or More.
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5. Cuts Down the Number of Molds You Have to Build.
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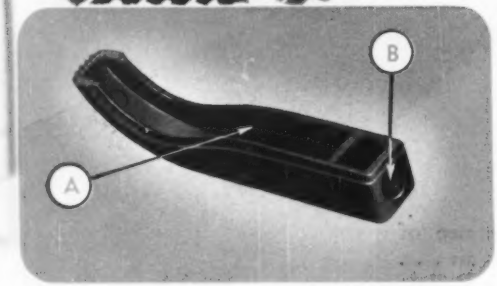


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Many times, great economies can be effected . . . costly delays avoided . . . by using a plastic part produced from one of Aico's stock molds.

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Emson Products Corporation selected this handle because of its smart styling . . . comfortable grip . . . *and the savings in time and costs afforded by the use of a stock mold part.*



Shiny, satiny black phenolic was used for this percolator handle because of its smooth appearance and its resistance to heat. Deep channel construction (A) provides ample strength with a minimum of material. A 3/16" hole (B) is drilled through the butt end to provide for easy, fast assembly. Handle is shaped to fit the grip. The handle is produced in a sixteen cavity, semi-automatic mold in one of our modern high speed presses at the rate of 5,000 pieces a day.



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MODERN mp PLASTICS

Progress Report on Plastics Monofilaments

Six different materials are used to make monofilaments which find their way to market in such forms as fabrics, insect screening, brush bristles, or fishing lines

THE manufacture of plastics monofilaments is so different from other types of extrusion or molding of plastics materials that it constitutes a separate and unique part of the plastics industry. There are only about a dozen companies now in commercial production of monofilaments, but these few are far from inactive.

Decorative fabrics woven of vinylidene chloride (saran) have been widely used and widely publicized in the automotive seat cover field, and the same fabrics are now being adopted for theater and institutional seating. Insect screening woven of vinylidene chloride is making metal screening manufacturers battle to hold the market they once monopolized. Nylon monofilaments are well established as a material for bristles and some brush manufacturers now using some other plastics for bristles. Polyethylene monofilaments have overcome the shrinkage hurdle and have re-entered the seat cover market. Curled casein monofilaments are being offered as a substitute for horsehair.

There are six different plastic materials which are extruded into monofilaments: vinylidene chloride, polyethylene, nylon, polystyrene, vinyl, and casein. Because of recent developments in all of these materials, a complete progress report would seem to be in order.

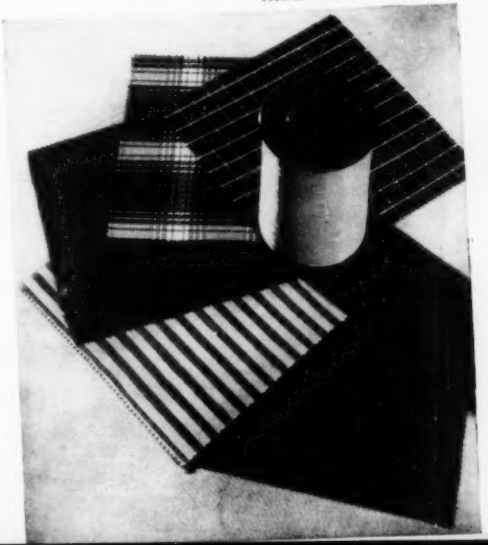
SARAN

Dow Chemical Co., sole manufacturer of vinylidene chloride (saran), states that approximately 98% of the saran resin made is used for production of monofilaments. The principal producer of saran monofilaments is the National Plastic Products Co., Odenton, Md. The trade name Velon is used to describe monofilaments extruded by Firestone Plastics Co., Pottstown, Pa., from a special compound based on vinylidene chloride resin supplied by Dow. (For purpose of simplicity, the term "saran" is used in this article as a generic term for all vinylidene chloride, including Velon.)

Saran monofilaments are also extruded by Lus-Trus Extruded Plastics, Inc., Ann Arbor, Mich., and by Sunlite Mfg. Co., Milwaukee, Wis.

Colorful seat fabrics in various patterns are woven of saran or polyethylene. Samples shown below are polyethylene

COURTESY AMERICAN VISCOSE CORP.



Seat cover fabrics

The consensus among saran monofilament producers is that about 90 to 95% of the decorative saran fabric produced is being used for automotive seat covers. There are at present about 20 weavers of saran upholstery and



COURTESY HAFNER ASSOCIATES, INC.

Saran monofilaments are woven into decorative fabrics on standard textile looms. Rear view of loom shows the warp being fed into the loom



COURTESY NATIONAL PLASTIC PRODUCTS CO.

Saran seat cover material is woven in plaids, checks, stripes, herringbone patterns, and solid colors

seat cover material. Some of the principal companies involved are: Lumite Div., Chicopee Mfg. Corp., Susquehanna Mills, Inc., Hafner Associates, Inc., Plastic-Weave Mills, Inc., and Deering-Miliken & Co., Inc. (all of New York, N. Y.), and Swift Mfg. Co., Columbus, Ga.

Seat cover material is generally woven from 0.010 or 0.012 in. diameter (10 or 12 gage) monofilament, although 0.008 in. has also been used. At a specific gravity of 1.69, a pound of saran will produce 5800 yd. of 10-gage monofilament or 4020 yd. of 12-gage monofilament (see Table I). A linear yard of 60-in. wide woven fabric requires between 1 and $1\frac{1}{2}$ lb. of resin, depending upon the weave.

The woven fabric is generally calendered on a three roll mill with an idler roll in the middle and heat and pressure applied on the top and bottom rolls. The temperature, which is normally around 170 to 180° F., causes the saran to shrink, and the fabric to densify.

The advantages of saran seat covers include durability, brilliance and fastness of color, chemical resistance, riding comfort, and ease of cleaning. Given the same treatment, a saran seat cover should last several times as long as a fiber cover. It will last about four years in the average passenger car, and it can be kept clean and new-looking with a minimum of effort. The filaments themselves are stainproof. Dirt or grease may work their way into the weave, but the marks can be removed by scrubbing with a stiff brush dampened with soap and water.

The only criticism ever levelled against the durability of saran fabrics is their vulnerability to lighted cigarettes. It is true that a lighted cigarette will burn a small hole in the saran, but the edges of the hole will be fused by the heat. Thus the filaments will not unravel and enlarge the hole. The same cigarette applied to conventional fabric upholstery might start a fire which would damage the entire car.

In price, the saran covers now are in a far better competitive position than they were a few years ago. Fiber "universal" (ready-made) covers range from $10 to $14 in price, and fiber custom made covers cost between $22 and $35. Saran universal covers sell for $15 to $22, and saran custom installations generally range from $27 to $40. Custom installations of rayon covers usually cost in the neighborhood of $40.

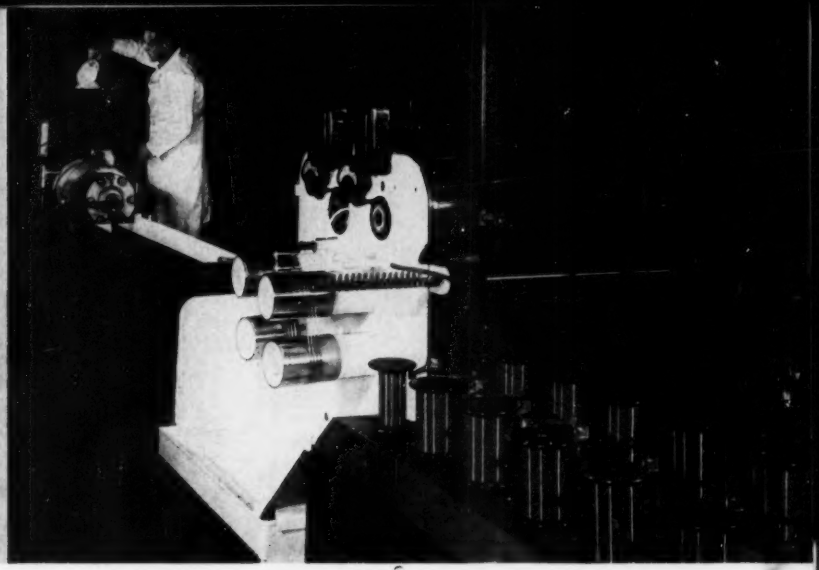
The seat cover market. Experts in the automobile accessory field usually figure that $14 worth of seat covers are sold for every 25,000 car miles driven in the United States. On this basis, total seat cover sales approached $200 million in 1948 and are expected to go well over $200 million in 1949.

Most of the seat covers sold are made of fiber (kraft paper), but saran fabrics are getting a steadily increasing share of the market. In 1948, 7 to 10% of the covers sold were saran. One expert estimates 20% of the covers being sold in 1949 are saran; another authority puts the figure at "40 to 50%." Predictions for 1950 range from 33 to 60%.

Table I.—Strength of Saran Monofilaments and Approximate Yield[a] (at 1.69 Specific Gravity)

Diameter	*Breaking point*	*Filament yield*
in.	*lb.*	*yd./lb.*
0.005	0.98	23,200
0.007	1.9	11,800
0.008	2.0	9,050
0.009	2.5	7,150
0.010	3.1	5,830
0.012	4.5	4,020
0.015	7.0	2,580
0.020	12.5	1,450
0.025	19.6	927

[a] Data from National Plastic Products Co.



Extrusion unit in Firestone Plastics Co., Pottstown, Pa., plant produces 90 miles of Velon monofilament per hour. The resin is fed into hopper at left, extruded through multihole die, and cooled in water. The filament is then toughened by orienting, or stretching, on four cylinders at center, which turn at different speeds. Finished filament is wound directly on the spools at right

A prominent feature of the saran seat cover sales campaign has been the joint marketing and advertising endeavor fostered by Dow Chemical Co. and National Plastic Products Co. It is believed that over a million dollars has been spent on this campaign. The weavers joined in the effort, and the advertising of all organizations has been coordinated. Firestone and its weaver customers have been conducting a similar campaign to promote increased use of Velon.

Other decorative fabrics

To date, there has been relatively little effort to promote the use of saran decorative fabrics for uses other than seat covers. This is partially due to the fact that the material was in short supply until this year. There have, however, been a number of applications (some of them on an experimental basis) which show what some of the future markets may be.

A natural development of the proven suitability of saran for seat covers is its use for original upholstery in buses, trains, and even in cars. Lumite fabric woven by Chicopee Mfg. Corp. has been installed in a group of buses operated by the Boston, Worcester & New York Street Railway Co., Framingham, Mass. Some experimental installations of Suskana saran fabric, produced by Susquehanna Mills, Inc., are being tested by the Fifth Avenue bus line in New York City. Velon fabric is being used on buses operated by Campus Coach Co., New York, and in some of the coaches on the Long Island Railroad. Packard station wagons are now coming off the production line with woven saran original upholstery.

Outside of the field of transportation, many weavers believe that there is a large potential market for woven saran fabrics for upholstery in theaters, hotel lobbies, department stores, and other places where upholstery gets hard wear, and a clean, bright appearance is difficult to maintain with conventional fabrics. One weaver is convinced that saran fabrics with highly styled colors and patterns could find a market in private homes—particularly for dining room chairs and porch or terrace furniture where exposure to the elements is a factor to be considered.

In addition to these applications, Lumite has been used for radio speaker grille cloth (on Westinghouse, Emerson, Crosley, Sparton, and Garod radios), to cover hot air ventilators in Convair planes, and as a wall covering in a large theater. The draw curtains, wings, borders, and seats in the Empress Theater, St. Louis, Mo., are made of Lumite. On the average, removing, cleaning, and re-installing the curtains in a theater cost about $1500. The saran draperies eliminate most of this cost because they can be cleaned in place. In addition, the management expects the saran to outwear any material previously used.

Saran plus other materials. The latest development in the use of saran monofilament in decorative fabric is the use of saran in combination with other materials to produce specialty fabrics. Wool and Velon have been combined to make a fabric which resembles heavy tweed; nylon and Velon, or rayon and Velon, have been combined to make a brocade type fabric.

Lucien Forestier Corp., New York, N. Y., has recently announced a brocatelle fabric which is made by having a warp of nylon or rayon and a woof of Velon. After weaving, the Velon is shrunk so as to create a raised pattern. Burlington Mills, New York, is now weaving a brocatelle which is a com-



COURTESY LUMITE DIV., CHICOPEE MFG. CORP.

Wallpaper showroom in department store has green and tan plaid woven saran on chairs, solid red saran on love seat

bination of rayon, cotton, and Velon. The Velon gives the material strength and gives it an appearance of having more "puff" (or raised portions) than it has. Using Velon, Burlington is able to make a material which sells for $3.49 per yd., retail, as compared with about $5.95 per yd. for comparable brocatelles.

Insect screening

Outside the field of decorative fabrics, the chief application of saran monofilaments is in insect screening. A 15-gage monofilament is used to weave the screening, which has 18 filaments per in. in the warp and 14 per in. in the woof.

Lumite Div., Chicopee Mfg. Corp., is the principal producer of screening. Chicopee uses monofilament supplied by National Plastic Products Co. Velon screening, formerly produced by Firestone Plastics Co., is now woven by Plastic Woven Products, Inc., Paterson, N. J., from monofilaments supplied by Firestone. Velon monofilaments are also used by Swift Mfg. Co., to weave insect screening.

The chief advantage of plastic insect screening is the fact that it does not rust or corrode—and therefore does not "bleed" and stain window frames or siding. It is also lighter in weight than metal and easier to handle. The saran screening is less expensive than copper or bronze screening and only slightly more costly than galvanized iron.

The total market for insect screening, according to the 1947 Census of Manufactures, is 593 million sq. ft. per year. One expert estimates that plastic screening is now getting about 10% of this business. The main obstacle in the way of increased sales of plastic screening is consumer resistance to a material which differs from those with which they are familiar.

New York bus has upholstery of finely woven saran monofilaments. Material is green with brown and cream stripes

COURTESY FIRESTONE PLASTICS CO.



Specialty applications

Tobacco shade cloth is woven from 15-gage saran monofilament by Chicopee Mfg. Corp. and from Velon by Plastic Woven Products, Inc. This cloth has 10 filaments per in. in the warp and 8 per in. in the woof, a more open weave than that used for insect screening.

Many growers of shade-grown tobacco are adopting the plastic shade cloth to do the job formerly done by cheesecloth. The initial cost of the saran cloth is higher than that of the cheesecloth, but its overwhelming advantages justify the difference. It will not tear as easily, and it has greater resistance to weathering. Because it will not rot, it can be left rolled up in the fields over the winter—whereas the cheesecloth had to be stored in sheds. In addition, the saran cloth will not support combustion. Insurance companies have recognized this fact by reducing the fire insurance premiums on fields where the saran cloth is used.

In addition to the tobacco shade cloth, Chicopee Mfg. Corp. is using saran filaments ranging from 3 to 20 gage to weave various specialty fabrics. Among the end uses are: plating tank nets, shoe liners, and filtering cloths.

Another specialty application is the high speed aircraft tow target cloth made by Plastic Woven Products, Inc., using 0.021-in. Velon monofilament. The main advantage of this cloth over canvas and the other materials used for tow targets is that it will not tear as easily, especially at high speeds. In addition, it is light in weight and will not rot in any climate. The cloth is woven in 36-in. widths with 12 filaments per in. in the warp and woof. It is furnished to Apple Textile Mfg. Co., Dayton, Ohio, in cut lengths of 31 ft. 4 inches. Two such lengths are sewed together by Apple to make a finished target about 30 ft. long and 6 ft. high.

POLYETHYLENE

This year two large companies announced that they are producing polyethylene monofilaments.

Both claim to have licked the shrinkage problem, which gave polyethylene a bad name in the seat cover field when it was first used a few years ago.

Reeves Brothers, Inc., New York, N. Y., announced last June that it is producing a seat cover fabric woven of 12-gage polyethylene monofilament. Reeves is extruding the monofilament, weaving the fabric, and marketing it under the trade name Reevon. The price is said to be "competitive with saran," and the shrinkage (for a piece of the fabric lying free in an oven) is said to be between 1 and 2% at 155° F.

The other company in the field is American Viscose Corp., Marcus Hook, Pa., which has announced the development of a new finishing treatment which preshrinks polyethylene fabrics so that there is a residual shrinkage of less than 2% at temperatures up to 165° F. The new method of stabilizing the fabric consists of first treating the fabric in a semi-relaxed state with hot water, hot air, or steam, thus permitting shrinkage of about 6 to 10% in both warp and filling. This is followed by a brief steam treatment on a decating machine to make the fabric more uniform and flexible. The fabric is then calendered to smooth its surface.

American Viscose is currently extruding 10, 11, and 12-gage polyethylene monofilaments, and is set up to extrude monofilaments up to 50 gage. A number of weavers are currently experimenting with the material.

As a seat cover material, polyethylene is said to have all the advantages of saran (except that polyethylene is flammable), plus a softer, more pleasant feel and greater pliability. American Viscose also claims that polyethylene fabric has a price advantage over saran which results from the lower specific gravity of the material. A 12-gage polyethylene monofilament, for example, runs 7346 yd. per lb. of resin, as against 4020 yd. for saran.

Outside of the seat cover field, polyethylene fabric may find more ready acceptance than saran in hotel upholstery and similar uses because of its softer feel. For the same reason, American Viscose thinks that the material may find wide application in women's shoes and handbags. The company is currently experimenting with cements for bonding the fabric to shoes, and for use in making handbags.

NYLON

Nylon monofilaments are produced only by the Plastics Dept., E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. About 90% of this monofilament production goes into the manufacture of brush bristles, which are discussed later in this article. The remaining 10% of nylon monofilaments are used for snelled hooks, fishing lines and leaders, tennis racket strings, musical instrument strings, and some miscellaneous applications.

Fishing lines and leaders are made from a more limp monofilament than that used for brushes. The sizes used run from 0.006 through 0.045-in. diameter in 0.001-in. increments. The 6-gage monofilament line has a breaking strength of 1.25 lb., and the 45-gage line is rated as 60-lb. test (see Table II).

Tennis racket strings are made from 0.055-in. monofilament specially treated to give it added impact strength. Musical instrument strings range from 0.028 to 0.060 in. in diameter. Among the other applications of nylon monofilament are fresh and salt water fishing lures which use a special crimped monofilament in place of bucktail, polar bear hair, or Jap feathers.

On an experimental basis, nylon monofilaments are being used in conveyor belts because of their high abrasion resistance. Another application which looks promising is the use of nylon monofilament for making bouffant cloth, a stiff material such as is used in theatrical costumes.

CASEIN

A recent entry in the plastics monofilament field is Caslen, an extruded casein monofilament manu-



Insect screening woven of saran monofilaments does not rust or corrode. It will resist weathering even if left in place through the winter

COURTESY DOW CHEMICAL CO.



Girl's hat and handbag, and seat cover in car, color are of fabric woven of polystyrene monofilaments

COURTESY AMERICAN VISCOSE CORP.



COURTESY E. I. DU PONT DE NEMOURS & CO., INC.

Sixteen spools are filled simultaneously with nylon monofilament on newly designed winding machine in Du Pont plant

factured by the Plastic Products Div., Rubberset Co., Newark, N. J. At present, the company is in full production only on a curled filament which can be used by furniture and mattress manufacturers in place of horsehair. The casein monofilament now sells for 94¢ per lb. and this price is expected to decline as production increases. Horsehair, most of which is imported from Argentina, sells for $1.25 to $1.40 per lb., and the supply and quality fluctuate from year to year. About 2½ million lb. were imported in 1948.

In addition to its favorable price position and ready supply, casein filament is uniformly clean, and the diameter and length of the filament are controllable. Rubberset is now extruding curled monofilaments 0.005 to 0.016 in. in diameter. Production of straight filaments in the same diameters, which can be woven into textiles for novelty effects, is expected to be underway in the near future.

On a production basis, the curled monofilament is now being used in a new automotive carburetor air filter manufactured by Fram Corp., Providence, R. I. The casein filaments are blended with pure wool and impregnated with tricresyl-phosphate to produce a replaceable cartridge type filter which is said to filter out 98.5% of the dirt and dust in the air passing through it.

Table II—Strength of Nylon Leaders and Monofilament Fishing Line*

Diameter (in.)	*Pound test*
0.006	1.25
0.007	1.75
0.008	2.25
0.009	2.9
0.010	3.5
0.011	4.3
0.012	5.1
0.013	6.0
0.014	7.0
0.015	8.0
0.016	9.1
0.017	10.3
0.018	11.5
0.019	12.8
0.021	15.6
0.023	20.0
0.028	30.0
0.032	40.0
0.040	50.0
0.045	60.0

* Data from Plastics Dept., E. I. du Pont de Nemours & Co., Inc.

BRISTLES

The most important plastic monofilament in the bristle field is nylon. Its first commercial use was in toothbrushes. From that beginning it has moved into all types of personal and household brushes, paint brushes, and various industrial brushes for special applications.

In some instances, the toughness, abrasion resistance, heat resistance, and chemical resistance of nylon bristles have made it possible for brushes to take over jobs previously done by other tools. An example is the use of specially designed nylon brushes to put labels on bottles—a job previously done by sponge rubber.

Among the other applications of nylon bristles are: brushes used to raise the nap on blankets; furniture upholstery brushes; brushes used to transfer ink from fountain to roller in textile printing where the bristles previously used often broke off and caused misprinting; boiler tube brushes to replace wire brushes which damaged the tubes by scratching them.

Du Pont is currently producing black or white level monofilament for bristles in diameters of 0.002 to 0.022 in. (in 0.001-in. increments), and in 0.028, 0.032, 0.036, 0.040, 0.050, 0.055, and 0.060-in. diameters. Cream-colored level monofilament is available in diameters from 0.002 to 0.014 inch.

Tapered nylon bristles, originally developed for use in paint brushes, are available in butt diameter of 0.009 in. tapering to 0.005 in., butt diameter of 0.012 in. tapering to 0.008 in., and butt diameter of 0.015 in. tapering to 0.010 inch. Double-tapered bristles (the larger diameter in the middle and the smaller at each end) are also available in all three sizes.

Because of their abrasion resistance, nylon bristles, both tapered and level, have outstanding wearing qualities. In paint brushes, for example, tapered nylon bristles wear up to five times as long as natural bristles. The resistance of master painters to making the shift from natural bristle to nylon is slowly being overcome and the sales of tapered bristles are steadily increasing. Du Pont reports that sales of tapered bristles have been higher in the

last six months than at any time since the war. The tapered bristles are also being used in push-type floor sweeps.

Perhaps the most widely used plastic bristles (other than nylon) are the ones sold under the trade name of Wynene by National Plastic Products Co. The manufacturer declines to reveal what materials are used in the bristles. The Ox Fibre Brush Co., Inc., Frederick, Md., is using Wynene bristles in bottle brushes, vegetable brushes, hand brushes, dusters, clothes brushes, floor sweeps, and various other brushes. Ox Fibre reports that the Wynene bristles have the advantages of bright color, low cost, and uniformity. Their main disadvantage is vulnerability to heat, 150° F. being maximum recommended use temperature.

Vinyl bristles. Mainly because of their sales-building possibilities and their low price, vinyl monofilaments are now being used for bristles by a number of brush manufacturers. The filaments used range from 0.008 to 0.022 in. and the applications have included such a variety of uses as in nail brushes, vegetable brushes, clothes brushes, floor brushes, and bath brushes.

The main disadvantage of vinyl bristles is their low service temperature. If the bristles are subjected to temperatures over 140° F., they will "fray"; that is, the ends will melt. It is hoped that the materials companies will soon discover ways to increase the heat resistance of vinyl bristles.

Polystyrene bristles. The higher heat resistance (approximately 180° F.) of polystyrene bristles gives this material a broad potential in the brush field, according to a statement made by a large brush manufacturer. To date, these bristles have been commercially used in whisk brooms and floor brooms, where the electrostatic quality of the material helps the brush pick up dust and lint. The Modglin Co., Los Angeles, Calif., has been in production for about two years on polystyrene-bristled whisk brooms, clothes brushes, and floor brooms.

A polystyrene whisk broom with a molded polystyrene case is also being manufactured by the Missouri Knife Co., St. Clair, Mo. The case is molded by St. Louis Plastic Molding Co., St. Louis, Mo. The 20-gage polystyrene bristles are extruded by The Ingwersen Mfg. Co., Denver, Colo.

Saran bristles. A number of companies are now experimenting with saran as a bristle material. It has the same color advantages as vinyl, seems to have the necessary strength, and has sufficient heat resistance to be used in boilable brushes. Lus-Trus Extruded Plastics, Inc., is selling saran bristles under the trade name Lustra-Bristle. National Plastic Products Co. is also producing saran bristles. These are being marketed under the name saran and advertising is being tied in with the promotion campaign previously mentioned.

The bristle market. One large brush manufacturer estimates that more than half of all the brushes made are now bristled with Tampico fiber (a vegetable fiber obtained from the bristle plant which grows in Mexico). The total production of plastic bristles (*not* including nylon), according to the same expert, consumes only about 150,000 to 200,000 lb. of resin per year. However, the plastic materials being used for bristles are all so new in the field that their impact has not yet been felt.

* * *

The foregoing survey shows what plastic materials are being extruded into monofilament—and what those monofilaments are being used for today. But this is only the beginning. Successful applications such as seat covers, upholstery, insect screening, and bristles are headed for wider markets. Other applications as yet undreamed of will undoubtedly appear as manufacturers discover the outstanding qualities and possibilities of plastics monofilaments.

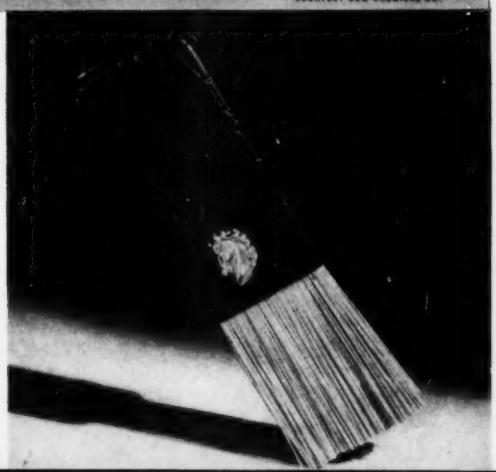
Clothes brush with 12-gage vinyl bristles and polystyrene back is made by Bennington Brush Co., Bennington, Vt.

COURTESY MONSANTO CHEMICAL CO

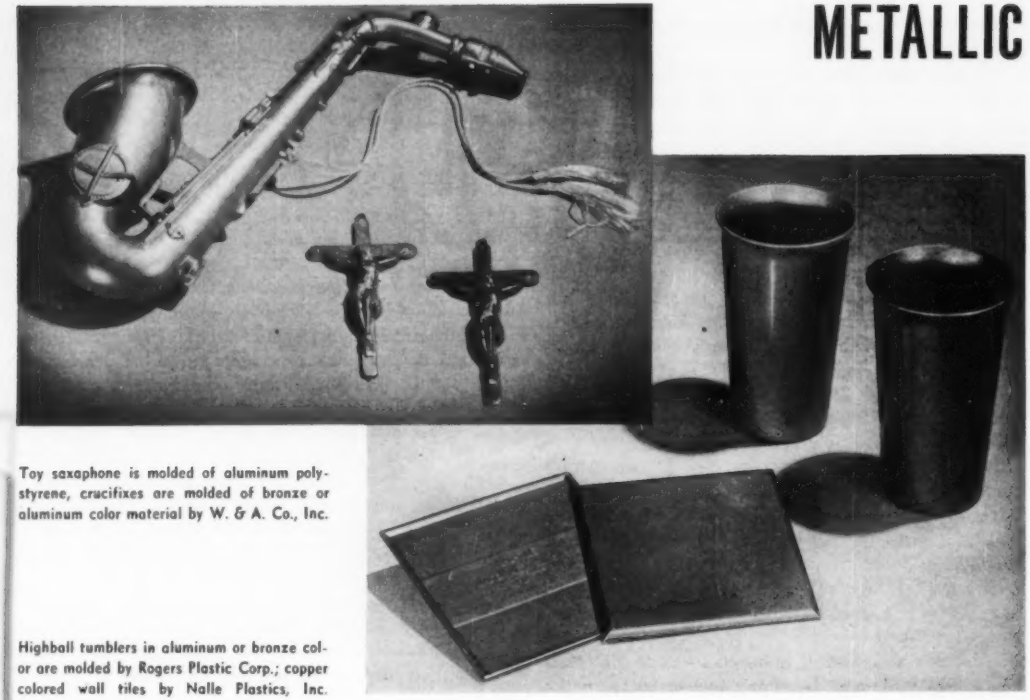


Whisk broom made by Missouri Knife Co. has case molded of polystyrene and 20-gage extruded polystyrene bristles

COURTESY DOW CHEMICAL CO.



METALLIC



Toy saxaphone is molded of aluminum polystyrene, crucifixes are molded of bronze or aluminum color material by W. & A. Co., Inc.

Highball tumblers in aluminum or bronze color are molded by Rogers Plastic Corp.; copper colored wall tiles by Nalle Plastics, Inc.

WHEN thermoplastics have competed directly with metals, particularly in decorative proprietary applications, they have generally been successful on the counts of strength, weight, and chemical resistance, but have, until recently, had a disadvantage in color.

With the introduction of metallic Lustrex in shades of aluminum, bronze, and copper, this disadvantage has been overcome. The applications to date are naturally specialized but a sufficient amount of work has been done by a few molders to establish molding practice on the material and to show further use possibilities.

Eliminating flow lines

Chief problem in molding metallic polystyrene is that of flow lines. The distribution of the metallic pigment is such that the particles tend to orient themselves in the direction of flow on the leading edge of the hot flowing material in the mold, and when two such leading edges come together the weld mark is greatly accentuated, even to the extent of looking like a possible fracture. The efficient way to eliminate these marks is to design the mold and regulate injection temperature in such a way that the material will spread through the mold like a fan originating at the gate. If a piece cannot be designed for molding without flow lines, metallic polystyrene should not be used, unless such flow lines are located so they will not be noticeable in the final product assembly.

Because of this same flow factor, it is not advisable to mold this material around inserts, nor is it advisable to mold pieces in which holes are part of the design. In the latter case, general practice is to mold the piece solid and drill holes afterward.

Probably the first job ever done in metallic polystyrene was a toy automatic produced by Pyro Plastics Corp., Union, N. J., in a gun metal shade of material. In this toy the appearance of a real automatic was faithfully reproduced. Another toy item in which the metallic plastic has been used to advantage is a toy aluminum saxaphone made by W. & A. Co., Inc., Attleboro, Mass. Since saxaphones are made of shiny metal, a toy reproduction in the silver-aluminum plastic had added merchandising advantage. The unit, made in a three-cavity combination mold, has one cavity each for the right and left halves and one cavity for the small diaphragm cap which produces the sound. In this job weld lines were tolerated because the raised keys and fittings of the toy made the weld lines less obvious.

Made in 40-cavity mold

W. & A. is also molding crucifixes in bronze and aluminum polystyrene. These low-cost items look

POLYSTYRENE

Aluminum, bronze, or copper colored material, if molded properly, produces inexpensive objects of unusual beauty



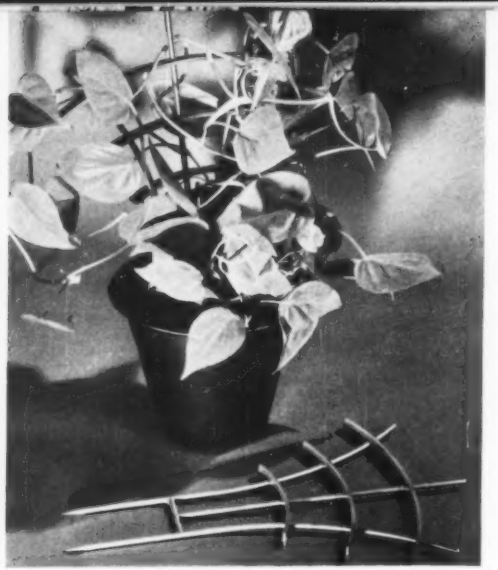
COLOR PLATES COURTESY MONSANTO CHEMICAL CO

Copper colored polystyrene large and small bowls, partitioned plates, tumblers, and salad tongs are made by Alladin Plastics, Inc.

much like costlier metal crucifixes. In this case the molds had to be redesigned and the gate adjusted to eliminate flow lines. The crucifixes illustrated are made in a 40-cavity mold, each shot weighing about 51 grams. The cycle is 21 seconds.

The first company to make really extensive use of the new material was Alladin Plastics, Inc., Los Angeles, Calif. Alladin is producing a "Ballerina" salad set of bowls and tongs and a "Party Pak" food serving set composed of four partitioned plates and four cups, designating the material as "Copperware". A feature of the Alladin products is the almost complete elimination of flow lines and sink marks. This feat is credited to Wilbur Rasmussen, Alladin's plant superintendent, and was no minor accomplishment in the case of the coffee cups where the handle posed a problem.

Rogers Plastic Corp., North Warren, Mass., started using aluminum metallic polystyrene in the wall base for the Telechron electric clock (MODERN PLASTICS, Aug. 1949, page 154) where the plastic directly replaced aluminum in the application at a saving of about 40% in cost. Rogers, maker of a standard line of flower pots, then swung into metallics on these, too. Because the pots are gated from bottom center, giving one direction flow of material, results have been excellent. The product looks like copper, but sells for about ¼ the price of



Switch to metallic polystyrene has upgraded the line of flower pots and trellises molded by Paramount Mfg. Co.



Four partitioned plates and matching cups make up party set molded of copper polystyrene by Alladin Plastics, Inc.

a real copper flower pot; it will not tarnish or corrode and need never be polished. In the larger Rogers flower pots special rib construction in the bottom permits rapid flow of material.

Tumblers free from taste

Another item made by Rogers is a line of highball tumblers in aluminum and bronze colored metallic polystyrene. They are much more reasonable in price than metal tumblers and have the advantage of freedom from taste. The Rogers plastic mail box (MODERN PLASTICS, June 1949, page 84) is also being made with top shell in aluminum and bronze plastic. Flow lines are apparent in this unit but their presence is not undesirable in this case.

A copper colored polystyrene wall tile is now produced as a standard line by Nalle Plastics, Inc., Austin, Texas. Good flow was easily obtained in this product because each tile has a wide rib through it which assures uniform filling. Since the tile is over 0.090 in. thick, the section is very heavy. Nalle has found that metallic polystyrene is rather susceptible to chill marks and recommends a mold temperature 5 to 10° F. higher than for ordinary colored material.

Paramount Mfg. Co., Leominster, Mass., maker of a large line of florists' items such as flower pots and miniature trellises, has switched its complete production from colored to metallic polystyrene with a view to upgrading its merchandising. The metallic product has a more conservative beauty and is less gaudy than colored material.

Flower pots as well as card boxes for gin rummy are molded in copper polystyrene by Harrison Co., Long Island City, N. Y. Again, the flower pots presented no problem, but the two-section card containers had to be styled to eliminate flow.

The possibilities of the material in curtain tiebacks, knobs and handles for furniture, trays, containers of all kinds, small picture frames, desk accessories, advertising novelties, are extensive. An indication of the interest of the packaging field in the material is the Hickok belt package, parts of which are molded by Boonton Molding Co., Boonton, N. J., out of copper polystyrene.



Copper colored polystyrene flower pots molded by Rogers Plastic Corp. are center gated for better flow and elimination of weld lines. Interior view of large pot shows special ribs in the bottom which speed the flow of the material



Christmas tree light wires coated in vari-colored vinyl add to holiday spirit of decorations. Socket and plug extension cord also achieves an effect of translucent iridescence which complements furnishings in the home

Vinyl Coating for Wire

VARIOUS authorities have estimated that somewhere around 70% of all extruded vinyl being used today is going into wire and cable coating. For many uses it is more economical and has longer life than other wire coverings.

Among the companies working almost exclusively with vinyl coating for wire is the Chester Cable Corp., Chester, N. Y., which specializes in wire for lamp cords, home appliances, Christmas tree lights, etc. Among its newest developments is a wire coating produced in colors which is both iridescent and translucent, like ribbon candy. When two colors of #20 wire are used on Christmas tree lights, they give an additional decorative effect, are flame retardant, and are reported to have longer life than rubber coated wire. The 1/32-in. vinyl sheath is made from B. F. Goodrich Chemical Co's. Geon 101. The iridescence is produced by extruding the translucent vinyl coating over bright twisted copper wire; the sheen of the copper, as seen through the vinyl, gives an attractive and novel effect.

More than 100,000,000 ft. of Christmas tree wiring, requiring around 500,000 lb. of vinyl compound, were used for Christmas tree lights last year. The new iridescent wire, called Plascene, is applied by the Abbott Mfg. Co., Summit, N. J., to Christmas tree light equipment in such color combinations as red and green, red and gold, and green and gold.

Similar Plascene wire is furnished in a wide variety of colors by the Chester Cable Corp. for lamps, radios, fans, clocks, and other small appliances. The colors blend well with house furnishings. Vinyl coated wire has not yet been approved for heavy-duty home wires such as used on irons.

Among the other types of wire made by this company is cable for neon signs. The wire is first coated with a 3/64-in. layer of polyethylene insulation, over which is extruded a 1/32-in. polyvinyl chloride jacket. The vinyl jacket not only provides abrasion resistance but gives a great measure of flame retardance. The former neon sign cable, of rubber and lacquered braid, was about 40 mils larger.

The vinyl-polyethylene combination has superior water resistance and offers superb protection against arcing. The wire for neon signs carries about 15,000 volts; the Chester cable is reported to prevent arcing at 50,000 volts.

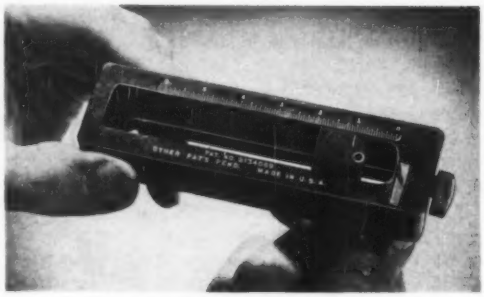
The neon sign wire has been tested to withstand cracking at —40° C. The manufacturer asserts that he has obtained this property by an extrusion technique and a specially designed take-off. A coated wire for neon signs is thus obtained which has better than usual electrical properties; longer life; is smaller and consequently lighter in weight; is flame resistant; and is easy to install. The cost is about the same as for the old type neon sign wire.

Also being extruded by the Chester Cable Corp. are large quantities of polyvinyl chloride coated building wire, in sizes from 14 to 4, which is being used to replace a great deal of the Type R rubber and braid wire in building and plant wiring. This wire has a high Underwriters' rating, sells at a competitive price with conventional wire, and is smaller in size so that more wires can be used in a conduit. Because of ease of stripping and light weight, installation time is reduced. There have been some complaints that the insulation is sometimes cut or torn when being pulled through conduits: the newest type building wire is impregnated with a lubricant so that it will pull easily through a conduit.

Phenolic Improves Gasket Cutter



Unit for cutting gaskets from a variety of materials has main body and clamping knobs molded of phenolic



Phenolic block is calibrated for direct diameter setting. White enamel is wiped into molded-in depressions

Plastic thumb knob on blade locking screw, colored green for identification, can be tightened by hand



PRODUCTION costs were cut in half and tooling costs cut by 25% by the use of molded phenolic instead of metal for four of the parts in the new Spearhead gasket cutter.

The cutter is manufactured by Zimmerman Packing Co., Cincinnati, Ohio, and the four phenolic parts are molded by Recto Molded Products, Cincinnati. The Spearhead cutter is said to be the first ever developed which can cut odd shapes as well as round gaskets. The tool combines features of a gasket cutter, a compass, a scribe, a limited depth cutter, and a razor-sharp knife. It can be used to cut asbestos, balsa wood, boxboard, cork, leather, linoleum, mica, vulcanized fiber, plastics, and various other pliable sheet materials.

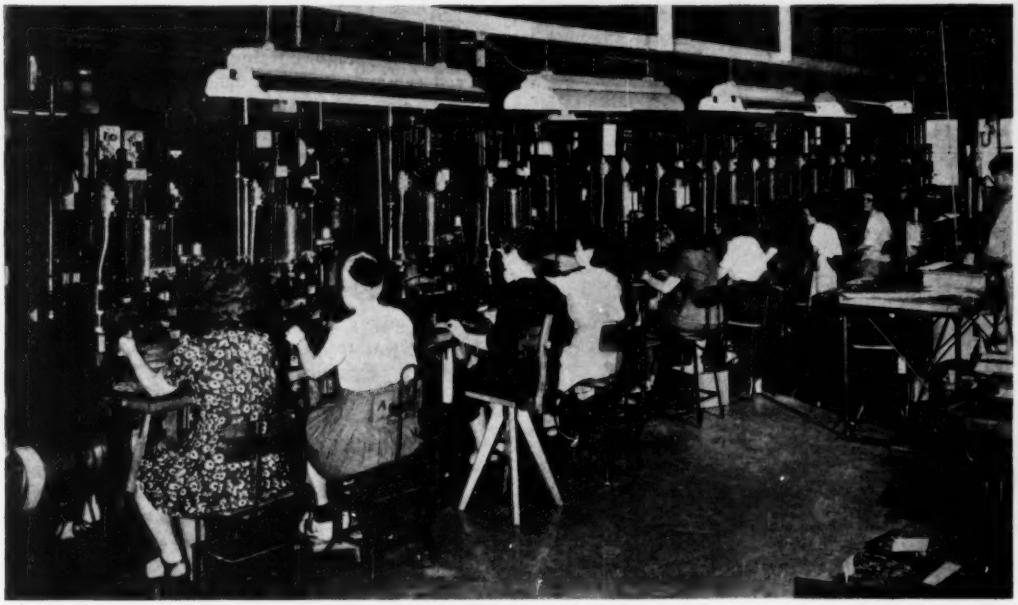
The main body of the gasket cutter is a piece about 6 by 1¼ by ¾ in. molded of black general purpose Bakelite phenolic. At one end of the piece is a slot set at a 55° angle to the base. The cutting blades slip into this slot and are held in place by a thumb screw which goes into a threaded brass insert molded in the side of the body. The thumb has a green phenolic knob.

A channel about ⅝ in. wide, ½ in. deep, and 3¾ in. long is molded in the bottom of the body and a slot 5/16 in. wide is molded through the piece along the center of the channel. A black phenolic slide block fits into the channel and a screw molded in the block goes through the slot. A large red phenolic knob fits over the screw so that the slide can be held firmly at any desired point in the channel. A hole in the slide fits over a metal pivot post which is used as a center point when circular gaskets are cut.

To facilitate setting the pivot post slide, a scale calibrated in sixteenths of an inch is molded in the bottom of the body and an index line is molded in the slide block. White enamel is wiped into the molded-in depressions. The same process is used for the patent notice on the bottom of the body, for a guide line on the side, and for the name of the tool and of the manufacturer on the top.

The original design for the Spearhead gasket cutter called for a body made of aluminum with a separate cap to hold the blade with two machine screws. The plastic body is molded in one piece. The slide block was originally turned out of solid steel and subsequently milled, drilled, and plated at a cost of 14¢ per block. The plastic block, molded in one operation, costs 6 cents.

The use of plastic also makes the cutter more attractive in appearance, and the fact that the color goes all the way through means that it will take hard knocks yet retain its good looks. Different colored knobs make it easier to follow directions.



Thirteen presses in Sangamo Electric plant are molding electrical parts of new alkyd compound

Alkyd Molding Compound Goes to Work

by H. W. De VORE*

Electrical industry is already making good use of fast-molding material first announced only a year ago

ORDINARILY in times of peace there is a gap of at least a decade between first announcement of a new resin and broad acceptance of it in molding powder form. This is particularly true where special presses are needed to mold the material.

A notable recent exception to this rule is the Plaskon alkyd molding compound formally announced only a year ago[1]. The polyester type alkyd resins, used for some years in the coatings and paint field, have thus far fitted so well into the markets at which they were aimed in molding powder form, that there is predicted for them by fairly conservative technologists an eventual annual market at least equal to the present volume of urea formaldehyde. This, of course, will be accomplished only by the development of a whole family of alkyd molding compounds, with a wide variety of fillers and properties.

The one alkyd molding material now on the market was developed on the assumption that, filled with minerals, it would present to the electrical industries a set of properties which would make possible better and more efficient design of electrical and insulating parts. The assumption has been borne out in practice, not so much by custom compression molders, as by electrical manufacturing organizations who have installed equipment to handle it.

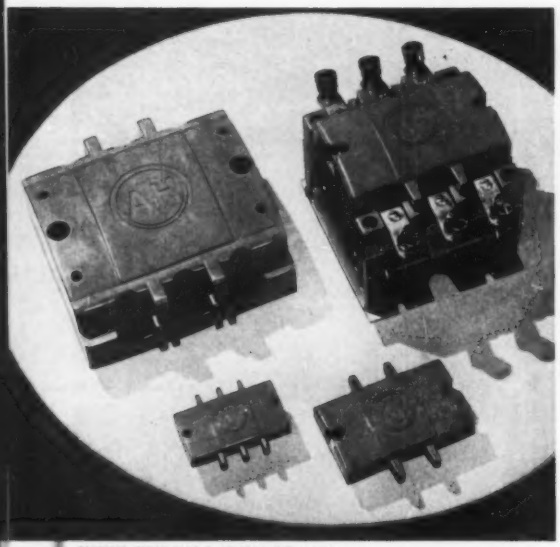
Now that the small high speed presses necessary for its molding have become commercially available, it is expected that custom molders will take up the material.

Importance to electrical industry

The initial assumption of a future for alkyd molding powder was based on several considerations. First, parts molded of this plastic are declared to

*Sales manager, molding materials, Plaskon Div., Libbey-Owens-Ford Glass Co., Toledo, Ohio.

[1] "Alkyd Hot Molding Compounds," by Dr. Maurice H. Bigelow, MODERN PLASTICS 26, 85-87 (Oct. 1948).



COURTESY ARROW-HART & HEGEMAN ELECTRIC CO.

Motor starters take advantage of good electrical and mechanical properties of the alkyd molding compound

yield higher values in electrical arc resistance than any previously known organic molding material; the arc resistance of insulating parts and their concomitant resistance to tracking are important where the insulating part is apt to be exposed to arc flashes between electrical conductors. The highest previously known arc resistance values were in melamine units which stood up to 100 and 130 sec. of arc; molded alkyd has a range of 200 seconds.

The second consideration was that dielectric strength, insulation resistance, and high frequency properties would be satisfactory. The high frequency properties of the alkyd material, expressed as loss factors, have proven so satisfactory that it is being used in radar and television equipment.

Number three in the list of considerations was the importance to the electrical engineer of high dimensional stability. Enhanced by the fact that inorganic minerals are used as fillers, molded parts after cooling show substantially no shrinkage in service, storage, or use. While there is some change in dimensions with varying temperatures, the co-efficient of expansion in molded parts is extremely low.

The fourth consideration was that of water absorption. A standard specimen immersed for a standard period of time at a specified temperature is stated to show lower water absorption than any other thermosetting plastic. This makes it less likely for the material to break down in electrical properties on exposure to high humidity. In fact, the improvement in this characteristic is so important that entirely new and more precise testing methods[2] have been developed in order to accumulate data.

The fifth factor was that of heat resistance which is extremely high, offering the engineer additional freedom for designing in difficult service conditions. This factor is important in electrical parts where contacts and other components are soldered in position.

Interesting mechanical properties

The mechanical properties of the alkyd material are interesting. Since it is mineral-filled, its tensile (3000 to 4000), flexural (8000 to 10,000), and compressive strengths (18,000 to 20,000) are somewhat lower than for cellulose-filled thermosetting plastics, but its heat resistance permits it to maintain its strength properties at very high temperatures. Modulus of elasticity (2,500,000) is higher than in most other compounds. Moldings retain an important amount of strength at temperatures from 350 to 400° F. and do not perceptibly change even on prolonged exposure to such temperatures.

Parts molded of alkyd are resistant to ketones, esters, alcohols, hydrocarbons, chlorinated compounds, and fatty acids, as well as to weak alkalies. Sodium chloride solution and sulfuric acid up to 30% have little effect.

Molding procedure

As already indicated, the material molds entirely differently from conventional thermosetting plastics. The most significant difference is in the rate of cure, the curing reaction itself supplying a large amount of the heat necessary to effect complete cure; once the material is brought up to its reactive point, curing proceeds in a "chain" reaction. Mold temperatures may be as low as 275° F. or as high as 350° F. and there is declared to be absolutely no danger of over-curing because of the heat resistance of the cured compound. Since the alkyd molding powder

Future Possibilities

As the accompanying article points out, a new alkyd molding compound has been widely accepted for molding electrical parts because of its following outstanding properties:

Dielectric strength — Arc resistance
Heat resistance — Dimensional stability
Low water absorption

Interesting to plastics users other than the electrical industry are its mechanical and chemical properties. Low molding pressures in simple equipment operating at fast cycles add to the inherent possibilities of the material.

[2] These methods, developed in the Plaskon Research Laboratory, Toledo, Ohio, are the subject of a technical paper now in preparation.

reaches a viscosity about equal to putty immediately upon contact with a hot mold, and remains in that state for approximately 4 sec., very low molding pressures are required; hydraulic or air pressures between 400 and 1200 p.s.i. with an average of about 800 p.s.i. are recommended.

The molds for this material must not be too tight and both loading and closing times must be short. No breathing, holding, or other generally known molding techniques are used because the material contains no volatiles and forms no gas.

The characteristics of the alkyd compound have thus necessitated the development of an entirely different type of molding press. This press, designed by the engineering department of the Plaskon Div., Libbey-Owens-Ford Glass Co., in collaboration with electrical manufacturers using the material and with a machinery maker who proposes to market the press, costs $1000, occupies not more than 9 sq. ft. of space, is completely automatic, and produces 360 units per hour of a 3½ sq. in. area piece in a single cavity mold. Six pieces per min. is fast molding.

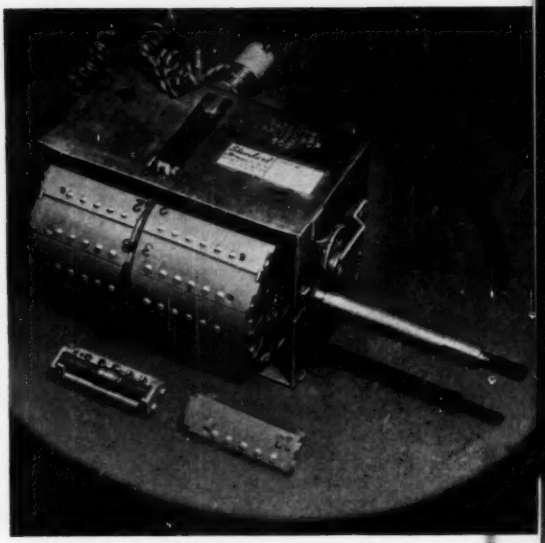
Commercial parts production

One of the first companies to set up for alkyd molding is Sangamo Electric Co., Springfield, Ill., with a battery of 13 presses molding electrolytic capacitors and terminal and contact blocks for time switches. The capacitors are used in radio and other electrical fields. The terminal and contact blocks used in the time switch are adjacent to actual switch contacts and are subject to frequent flashing of arcs when contacts are open and closed. Not only does the alkyd provide suitable arc resistance, but Sangamo is obtaining production rates higher than are possible with any other material.

Another company which has set up its own molding shop for the use of this material is the Arrow-Hart & Hegeman Electric Co., Hartford, Conn. The company's line of motor starters was being redesigned at the time the new molding material was introduced and this coincidence contributed to the development. One of the new magnetic starters produced by this company is only half the size of conventional magnetic starters of the same capacity, a size reduction which is made possible to a considerable extent by the use of the alkyd material.

Each starter uses two molded parts, one to serve as a base and combining the functions of a terminal block, and the other as a hood. The block provides the only insulating material between terminals. The block or lower part serves as a base for the contacts, and slots in the base match similar slots in the hood, so that when the device is assembled, individual chambers are formed, completely enclosing each contact. The dimensional stability of the material has paid off in this assembling.

A new type of television tuning unit recently developed by Standard Coil Products Co., Chicago, Ill., employs alkyd molding material in a multiplicity of small parts. There are 24 arc-shaped segments, each provided with five or six silver contact buttons (inserted after molding and soldered in position), assembled to form a drum 3 in. in diameter. The drum makes contact with permanent terminals.



COURTESY STANDARD COIL PRODUCTS CO.

Molded alkyd drum of television tuning unit is not affected by heat when multiple contacts are soldered

Dimensional stability in addition to the electrical properties and extreme accuracy in molding were the desirable qualities in this case. Actual tolerances of plus or minus 0.005 in. must be held. The high heat resistance of the new plastic is important since molten solder is in contact with it for a short period.

Parts for this "Standard Tuner" are molded by Wilcox Plastics, Inc., Los Angeles, Calif.; Mayfair Molded Products Corp., Chicago, Ill.; and Trans-Matic Plastics Co., Chicago, at remarkable speeds. One fairly large part, turned out by Wilcox, has a 30-sec. cycle, using an eight-cavity mold under 4000-lb. pressure in a conventional molding press.

The Centralab Div., Globe Union Inc., Milwaukee, Wis., is producing a capacitor for television work with a shell molded of alkyd. This shell, into which is molded a metal insert, has a total finished weight of 1 ounce.

New markets

While the present material will no doubt find its greatest markets in the electrical field, there is reported interest among manufacturers of grommets, sheaves, small wheels, and similar items purely because of the mechanical properties of the alkyd.

Other fields, the makers predict, will open up to variations of the material in new formulations.



A standard set of 48 acetate Christmas ornaments includes lamp, holder, and reflector packed in a combination shipping container, display box, and storage unit



Glowing under influence of ultra-violet light, Christmas ornaments die-cut from fluorescent acetate come in red, blue, yellow, and green

Wireless Christmas Tree Lights

A NEW idea in Christmas tree decorations—fluorescent acetate ornaments which emit a soft glow when exposed to ultra-violet light—is being marketed this season by Magic-Glow Corp., Chicago, Ill.

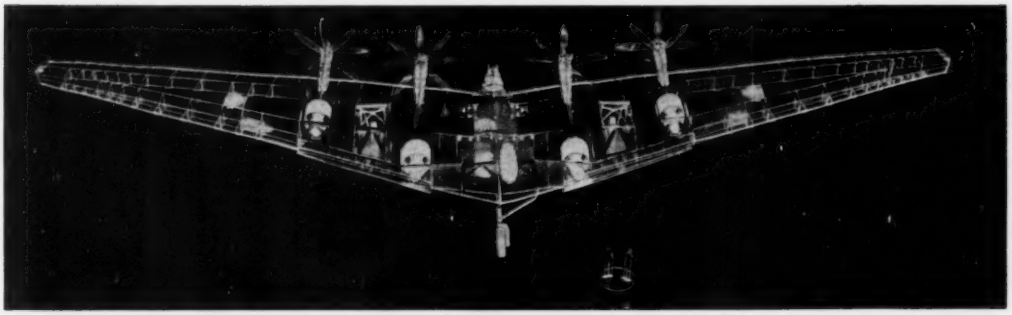
Outgrowth of several years of experimentation by Peter Pullman, president of the company, the Magic-Glow ornaments are die-cut from flat sheets of fluorescent cellulose acetate material supplied by Monsanto Chemical Co. and Celanese Corp. Depending on the size of the particular ornament, stock ranging in thickness from 0.001 to 0.003 in. is employed. The angels, stars, bells, snowflakes, and animals are available in four colors—red, blue, yellow, and green.

Special ultra-violet lamp used

Completely safe because of the absence of wires or bulbs, the ornaments are simply hung on the Christmas tree and a specially designed ultra-violet lamp, which comes as part of the ornament set, is so placed that its rays are directed toward them. The fluorescent tube used not only causes the ornaments to give off a pleasing glow, but also provides sufficient visible light so that the tree is not shrouded in darkness. The lamp has a rated life of 2500 hours, insuring trouble-free Yuletide service for a number of years.

The standard set of 48 ornaments, including 11 which are of three-dimensional construction with two sheets of acetate joined at right angles, comes packed with the special lamp and holder, in a combination shipping box, display container, and storage unit. It retails at $12.95. The ornaments themselves are separately available in various supplementary combinations at modest cost. There are also a number of extra-large designs available for window displays, large exhibition trees, etc.

Virtually indestructible in normal use, the sheet acetate ornaments permit unusual lighting effects with complete safety and are listed by Underwriters' Laboratories, I[illegible]



Aircraft model, made on 1 to 40 scale, has spars and ribs cut from acetate sheet. Larger parts are fabricated of acrylic

Phantom Model of Flying Wing

WHEN the first Northrop Flying Wing was being built, the production illustration group of Northrop Aircraft, Inc., Hawthorne, Calif., was faced with the problem of preparing drawings for production assembly reference and incorporation in the service manual. The drawings had to be unusually detailed because the plane was unconventional and the personnel who had to use the drawings were unfamiliar with its structure.

Northrop illustrators decided to use an accurately scaled plastic model of the airplane as an aid in preparing the drawing. The model includes all the basic structural members of the plane. Thus, phantom perspectives can be prepared by photographing the model from the desired angle and drawing in the details to be illustrated.

Acetate and acrylic used

The model was made on a 1 to 40 scale and has a wing span of 51.6 inches. It weighs 36 ounces. Spars, ribs, and contour frames were laid out from reduced photo templates and cut from transparent Lumarith cellulose acetate sheet stock between 0.040 and 0.060 in. thick. The acetate parts were assembled with acetone and a few screws. In some cases, a flat sheet of acetate was used to take the place of a structural member which actually has a ribbed construction. In such cases, the ribs were stencilled on the transparent acetate piece.

Power plants, landing gear, armament and other main items of equipment were fabricated from blocks of acrylic and installed in their proper locations in the model.

Model finds other uses

The model made by the production illustration group aroused interest in other departments of the Northrop company, and five additional models were made. These were taken to Washington, Wright Field, and other places and used to demonstrate the simplicity of Flying Wing structure, and to show how fuel, crew members, cargo, etc. could be disposed in this new type of airplane. To make the models more easily transportable, carrying cases were made for them. Small plastic figures of men were also made to dramatize the comparative size of the 100-ton Flying Wing.



Illustrator uses plastic model to prepare phantom drawing of plane. Inset shows close-up rear view of center section

What's New in Vinyl Spread Coating?

Continuing the discussion started last month of spread coating methods and equipment. By increased use of plastisols and organosols, coaters are working towards faster, less costly production of better coated fabrics



COURTESY L. E. CARPENTER CO.

Deeply embossed plastisol coated fabric (magnified in background above) is being used in handbags and shoes

EQUIPMENT used for vinyl spread coating is so multitudinous and so varied in mechanical form that no general rule of equipment selection can be laid down to meet all conditions. Manufacturers of equipment have more or less standard units for sale, but each processor varies or alters them to fit his own ideas; any number of processors even build a great part of their own equipment. Manufacturers contend, however, that the day when a man can successfully build his own spread coating equipment is passing. They say that the increasing complexities involved and the improved, speeded-up production to be obtained from new machines will leave the operator who builds his own equipment far behind in the battle for markets. Furthermore, say the machinery people, a man's time consumed in building equipment might be employed more profitably in maintenance.

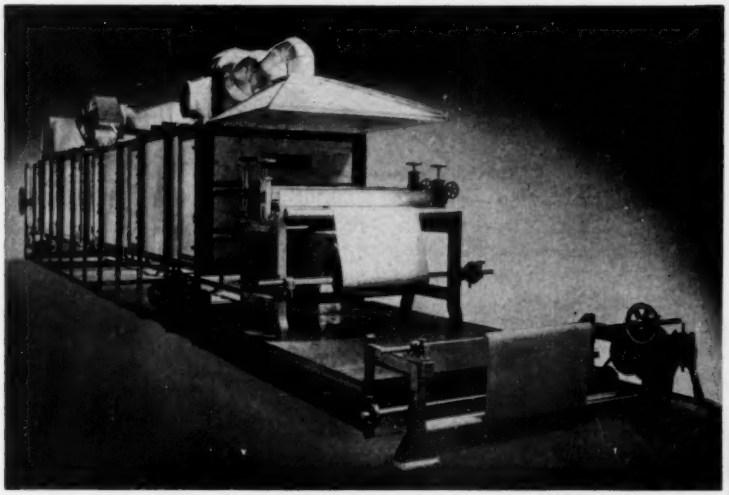
In addition to the new types of coating heads, described previously in this series of articles, heating apparatus and take-off and wind-up equipment for fabric coaters is receiving close attention from the machinery manufacturers who formerly concentrated the biggest part of their effort on paper and textile industries.

No. 5 of a series on vinyl film, sheet, and coatings

Plastisols and organosols

Chief reason for this activity seems to be the particular applicability of the recently developed plastisols and organosols to spread coating on fabric. This does not mean that solution coating is out of the running; it will probably always have a place, especially for light weight materials, but plastisols and organosols not only contribute a fine surface and good hand to coated fabric with fewer passes through the machine, but they also eliminate the necessity of employing costly and sometimes hazardous solvents. Today there are solvent recovery plants which cost as much as $250,000 standing idle because they are no longer needed.

In the older coatings — nitrocellulose and rubber — the coat is applied in a succession of thin layers from solution. After each coat is applied, the solvent is evaporated in an oven and recovered by an elaborate system or dispersed in the air. A vinyl plastisol or paste does not require any solvent. Polyvinyl chloride or copolymers are relatively insoluble, or dissolve only very slowly in certain plasticizers when cold, but dissolve or gel rapidly to form this paste when heated. An or-



COURTESY MEADOWS MACHINE WORKS

Double pass, high temperature coating machine, 45 ft. long over-all, handles 60-in. wide goods. It is used for applying and curing resin coatings which require high curing temperatures

ganosol, too, is a combination of resin and plasticizer to which is added a low cost diluent. The diluent must be evaporated, but it is a far less costly or hazardous operation than that of evaporating the solvent used in so-called solution coatings.

Sometimes plastisols, too, are modified by adding a small amount of diluent, but they still remain plastisols by nature. Deciding which to use is largely a matter of the processor's own judgement, guided by the type of equipment he has and the end product he expects to produce.

Coating thickness increased

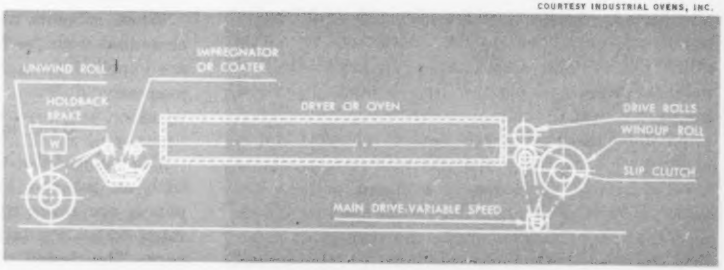
One development that needs particular emphasis as a result of improved materials and equipment is the growing tendency to increase the amount of vinyl coating laid down on a fabric and decrease the thickness of the fabric. The old practice, for upholstery as an example, would be to use a proportion of about a 10-mil plastic coating on a 20-mil cloth. Today there is a rapidly growing movement to reverse this ratio even to the extent of using, say, a 24-mil vinyl coating on a 6-mil cloth. The result is an improvement in hand and drape that has caught the attention of every upholsterer and fabricator who makes any effort to keep up with new developments in his industry.

The principal change in coating equipment resulting from the development of plastisols and organosols has been in heating units. In solvent coating with nitrocellulose or rubber, ovens from 40 to 100 ft. in length are used for drying single coats a few mils thick, an operation which is repeated until the required number of coats, or proper thickness, is built up.

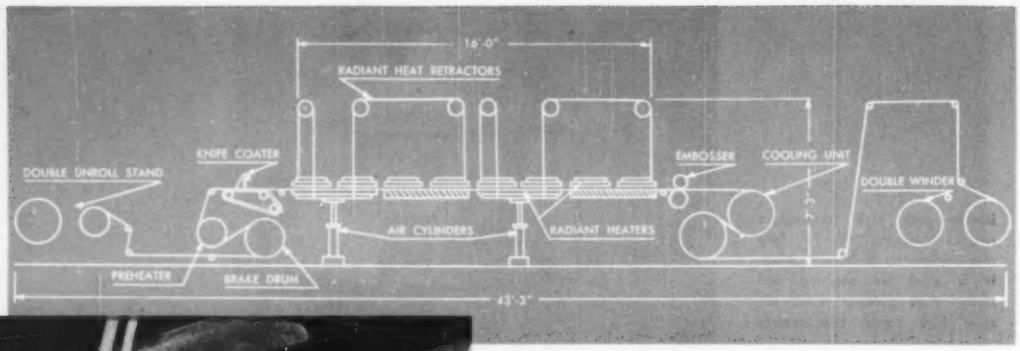
During its course through the drying oven, the web is carried over steam coils which maintain a temperature of up to 300°. The oven is generally enclosed although some operators use only a hood. A system of ducts and blowers must be provided for keeping the air in circulation and drawing off the solvent fumes.

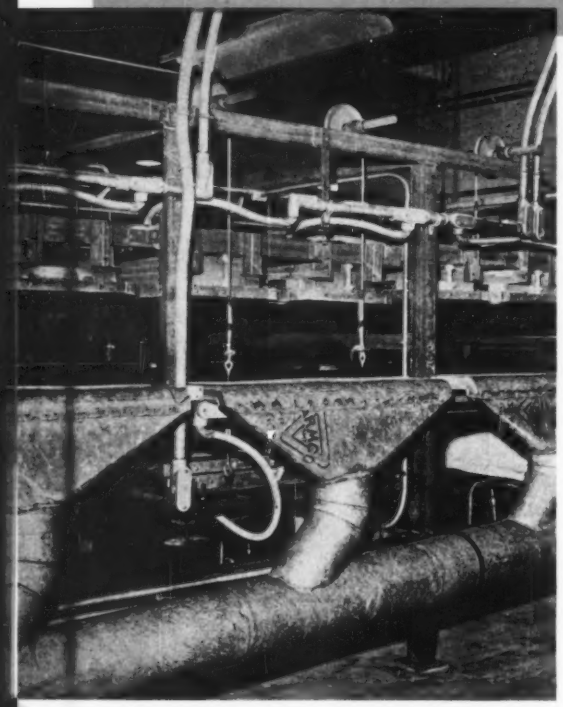
The vinyls require a much higher processing heat than nitrocellulose or rubber—up to 400° is not uncommon. The resin and plasticizer must be fused or literally melted into a continuous film to become an integral part of the cloth. Since most plants are not equipped to furnish steam heat at

COURTESY INDUSTRIAL OVENS, INC.



Principle involved in most simple coating systems. The material passes through the coater and oven at uniform speed, the unwinding roll being equipped with a friction brake to impose tension on the material. Wind-up roll is driven by the main drive through a clutch





COURTESY INDUSTRIAL RADIANT HEAT CORP

Above: Simplified diagram of fabric coating system equipped with fiber glass heaters, as described in text. Double unroll and wind-up stands permit continuous operation. Air cylinders raise and lower the heating units. Left: How heating units are positioned above and below the web. Ducts are attached at bottom to remove fumes circulated by a blower

temperatures over 300°, which require high boiler pressures; various other methods are used to obtain the additional heat.

Nearly all ovens are zoned separately for drying and fusing. Such ovens are specially equipped to obtain the extra heat in the fusing zone by some other means than steam pipes. Indirect oil fired heaters, direct gas, electric strip heaters, infra-red lamps, or radiant heat may be used. The choice often depends upon which heating element is the least costly to operate in a given locality. If flame is used, it must, of course, be enclosed, and the hot atmosphere it produces must be pumped or blown through a duct located above the web of cloth so that the heated air impinges down on the coated side. The trick is to keep all that heated air at the same temperature. In the old system where steam pipes were used exclusively, the under or fabric side of the web ran a few inches over the pipes and the temperature in the oven was subject to wide variation.

New equipment now provided for drying ovens consists of small sections, about 4 ft. wide by 3 ft. high, that sit on top of the oven. They blow heated air into the oven at a controlled, uniform temperature and thus permit more efficient treatment at higher speed. Some webs have been run as high as 90 ft. a minute in ovens so equipped. Furthermore, each zone is provided with a different set of heaters so that when the change is made from 300 to 350°, there is no danger of overlapping. Standard thermocouples and other electrical control instruments are necessary to obtain exacting results. More and more processors are using recording controllers which trace on a visible graph the exact temperature maintained in the oven at all times. If the coated web shows defects after running, the operator can determine from the graph whether or not the temperature was at fault.

When solvents are used, exhaust fans are synchronized with the heating system so that all fumes are expelled through ducts especially built for that purpose.

Oven insulation important

The walls of the oven are sometimes simply metal with an asbestos lining, but the latest type wall panels are made up with two metal sheets separated by an insulating material that will not compact. The design of these 3 to 4 in. thick panels

incorporates an ingenious method of overlapping and bending the metal to eliminate continuous metal heat-conducting paths through the insulation, one of the chief causes of wasted heat.

One of the latest heating units that holds great promise for the spread coating industry is a compact radiant heater in which the heating elements are enclosed in glass fiber. It is claimed that a coating line employing this heater — plus coating head and embossing rolls — can be compressed into a 43-ft. space to do the same amount of work as a standard 90-ft. line without the embossing roll.

Coating time reduced

With this fiber glass radiant heater incorporated in a coating line, equipment can be assembled that will dry, fuse, and emboss a web in one-eighth the time consumed on a conventional coater, according to the manufacturer. The radiant heater can be used for solvent coating if desired but is particularly applicable for plastisols and organosols since the high heat necessary for fusing can be easily maintained and controlled.

The heating unit is built almost entirely of fiber glass. The electrical element is Nichrome V wire encased in a fiber glass sleeve. This strand is woven over and under a series of glass cloth tapes. Both sides are covered with glass cloth, and the three layers are then drawn taut and fastened to an aluminum frame. This heating mat is backed with 3½ in. of Fiberglas wool. The heating blanket which faces the material to be heat treated is only 0.030 in. thick—the heat from the wire thus passes through only this thin area and is reported to give better than 95% efficiency. Technicians assert that this "black heat" gives penetration superior to that of visible heat and, furthermore, that it penetrates light and dark materials with equal rapidity. Black heat also reduces the fire hazard.

Coating weights of 6 to 32 dry oz. are today being dried, fused, and embossed at production speeds of 8 to 35 yd. per min. in one pass where these radiant heat units are employed. In one set-up, for example, there are eight heating panels placed above the web which heat the coating compound, and two below to heat the fabric. The top heaters in this operation operate at approximately 525° and the lower heaters at approximately 350° F. The material runs as a continuous web virtually in contact with the lower heaters. The top heating panels are positioned 1½ in. above the coating.

This set-up is equipped with small blower attachments which circulate air between the heating panels and the web. The blowers assist in taking off the fumes emanating from the plasticizers. Side ventilation ducts that can be easily installed by a tinsmith take the fumes away. No oven arrangement is required for this operation since the heating panels can be attached to the frame supporting the web, but an oven can be utilized if desired. The manufacturers of this heater emphasize that although the above-described set-up is a plastisol operation, the same equipment can be used to dry, fuse, and emboss organosol coatings, solvent coatings, emulsion coatings, impregnations, and thermoset plastic coatings on either fabric or paper. In many cases the fabric is first coated with a vinyl latex before the heavier coat is applied to improve adhesion and to cause the bulk of the coating to rest on the fabric rather than to impregnate it.

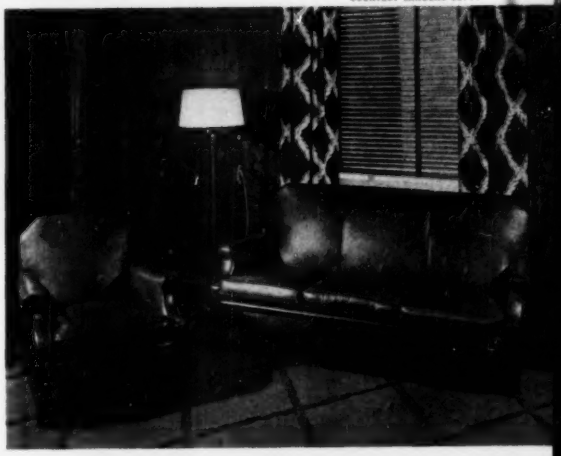
It is a comparatively simple matter to add a set of these units to standard oven equipment in order to obtain greater production speed in drying operations or to act as a fusing unit. Operating cost insofar as electricity is concerned compares favorably with steam or gas but is dependent upon the cost of electricity in the area. The 10-unit set-up described above consumes approximately 40 kw. per hour. Ten units complete with controls and blowers to handle a 60-in. web sell for around $7500. A fusing section alone, to be installed within a standard oven and consisting of from 2 to 4 heating units, would cost under $5000. The controls furnished with the heating units consist of pilot light, off and on switches, a magnetic contactor, and a percentage timer to hold temperature of the unit within 2% of the setting.

Another interesting angle in the construction of a coating machine equipped exclusively with these fiber glass heaters is the location of the embossing roll. The web passes off the heaters directly into the nip of the embossing roll which is on top of the rubber roll. The embossing roll is chilled. The short space necessary for the coated fabric to travel,

(*Please turn to page* 148)

Up-to-date upholsterers are attracted by the improved hand and drape of fabrics coated on new equipment

COURTESY LANDERS CORP.





Hunting license tag holder is fabricated of 0.032-in. thick Vinylite sheeting. License tag can be displayed pinned to hunter's back (as is required by law in some states) and license receipt can be displayed on reverse side of the holder. Seams are electronically sealed on special equipment developed by Mayflower Electronic Devices, Inc., 6014 Hudson Blvd., West New York, N. J. Holders are manufactured by Williamsport Die & Machine Co., Williamsport, Pa.

Electric lamp or appliance cords which are longer than necessary can be tucked out of the way inside the round housing of the Wyre-Safe plug. The plug itself is urea and the round housing is polystyrene. They are molded of ivory or brown material by Prisk Plastic Molding Co., Alhambra, Calif., for H. E. Page & Associates, 2846 Westshire Dr., Los Angeles



Red polystyrene poker chip rack holds two decks of cards and 180 chips. The chips are stacked in six black trays which can be removed from the rack and placed in front of each player. When the trays are on the rack, they are locked in place by turning down the ivory colored carrying handles. The interlocking chips are the usual red, white, and blue. Pyro Plastics Corp., 690 Chestnut St., Union, Union County, N. J., manufactures the set



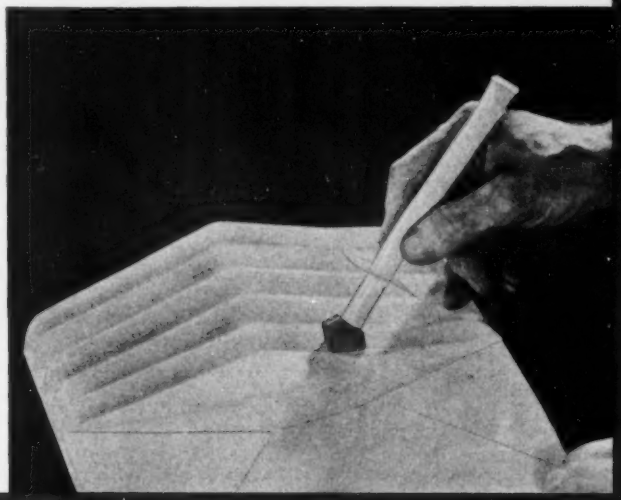
PLASTICS

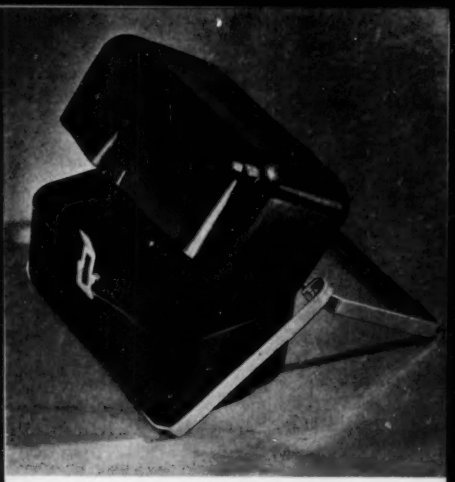


Novelty coasters molded of clear Bakelite polystyrene have play value as well as utility. Coasters are molded in two parts with animal characters printed in bright colors on the lower piece. Depressions are molded in for the animals' eyes and steel balls are put between the two parts when they are assembled. Between drinks, users can amuse themselves by trying to roll the balls into the holes. Made by Manchester Molding Co., Manchester, Vt.

PRODUCTS

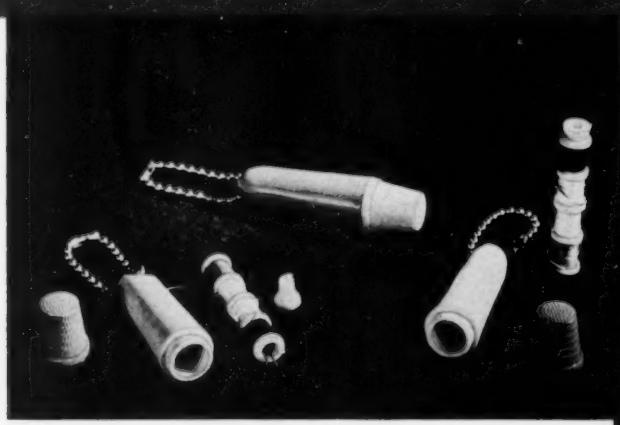
Moistener for envelopes, stamps, or gummed labels has large water reservoir tube molded of new Hercules ethyl cellulose compound which contains 30% plasticizer and is unusually flexible. Flow of water can be started by squeezing the tube; rate of flow can be controlled by amount of pressure exerted on the gummed surface. Superfluous water is drawn back by valve when pressure is released. Manufactured by Hydrawlik Co., Roselle, N. J.

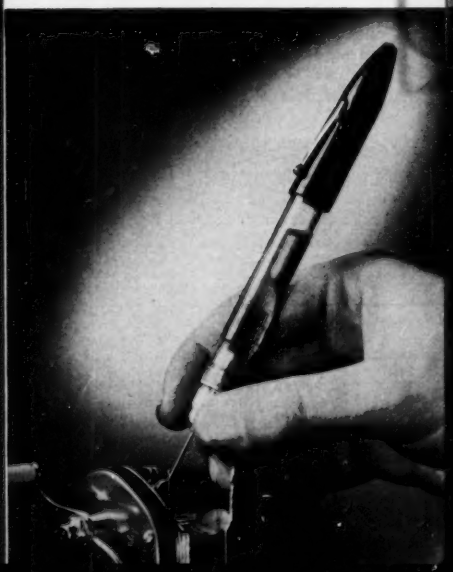




Flip-Flop Bait Box makes it easier to get hold of worms when they are needed. Before selecting a worm, fisherman turns box over and the worms, which normally crawl to the bottom of the dirt, find themselves on top. Wayne Plastic Products, 801 Glasgow, Fort Wayne, Ind., molds the box parts of Durez phenolic for Krause Hardware & Sporting Goods, Inc., Fort Wayne

Handy household oiler is same shape and size as a fountain pen. Small quantity of oil is ejected each time the steel tip is pressed on part to be oiled. Oil is held in transparent barrel molded of Tenite I cellulose acetate. Black screw cap is Tenite II cellulose acetate butyrate. Erie Resistor Corp., 644 W. 12th St., Erie Pa., molds the barrels and Boonton Molding Co., 326 Myrtle Ave., Boonton, N. J., supplies the caps. The Pres-To Oiler is made by Dill Mfg. Co., 700 E. 82nd St., Cleveland, Ohio





Compact sewing kit contains four spools of thread, needles, and thimble, but is small enough to be carried in a purse. Kit consists of four parts, all molded of cellulose acetate: shell, partitioned spool unit, stopper for needle compartment in center of spool unit, and a thimble which also serves as a closure. Parts are molded by Gary Enterprises, Inc., 12 Bergen St., Brooklyn, N. Y., for Nova-Plas Mfg. Co., Inc., 32 Fulton St., New York

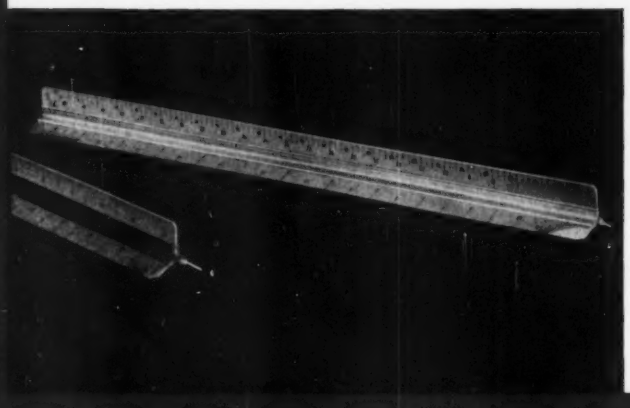


Mem-O-Tray, molded of phenolic, combines in one unit many of the accessories needed on a desk. Tray has compartment for memo paper, two channels for pencils, hinged pen holder, and two deep compartments which can be used as ash trays or for chips and pins. Can be used as an ad specialty, with advertiser's name imprinted on metal plate which holds memo paper. Tray is molded by Plastic Molders, Inc., 2540 Stevens Ave., Minneapolis, Minn. Marketed by Viking Products, 1513 East Lake St., Minneapolis, Minn.

Spice cabinet which holds up to 10 standard size spice cans is molded of Styron polystyrene. The unit, which measures 6⅝ by 5¾ by 3 in., can easily be attached to the wall. Display insert helps sell the cabinet by illustrating possible uses. Molded by Columbus Plastic Products, Inc., 1625 W. Mound St., Columbus 4, Ohio



Tri-Fin scale consists of extruded aluminum core and three scales cut from 0.040-in. white rigid Vinylite sheet stock. Black markings are printed on the vinyl, and 0.005-in. thick transparent overlay is put on to protect the markings. The vinyl scales are light in weight, chip-proof, easy to read, and will not discolor with age. The Tri-Fin is made as an engineer's scale or architect's scale. Made by Wolsey Co., 727 Kohler St., Los Angeles

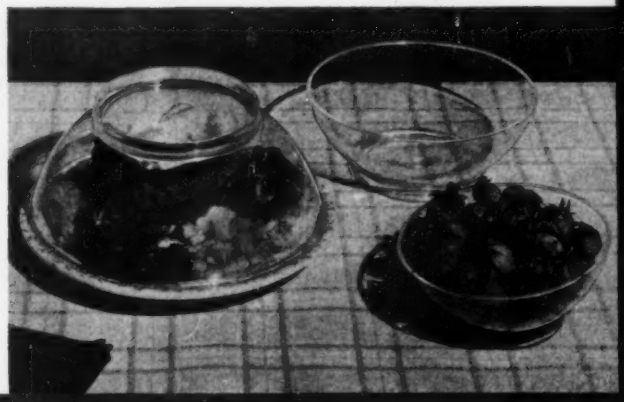


PLASTICS

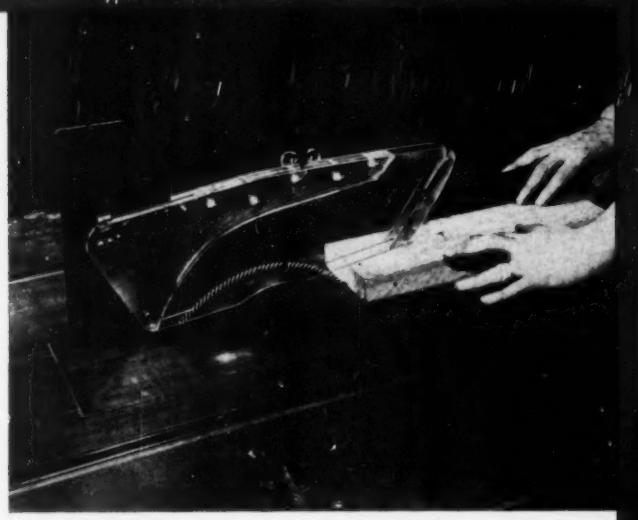


Roll-away toilet tissue dispenser keeps roll of tissue clean and keeps it out of sight. Tissue feeds through a slot in the bottom of the dispenser and tears off evenly across a plastic lip. Container is molded in two parts of Styron or Lustrex polystyrene in a variety of colors and can easily be attached to the bathroom wall. Molded by Worcester Moulded Plastics Co., 14 Hygeia St., Worcester 8, Mass., for Produx, Inc., Worcester, Mass.

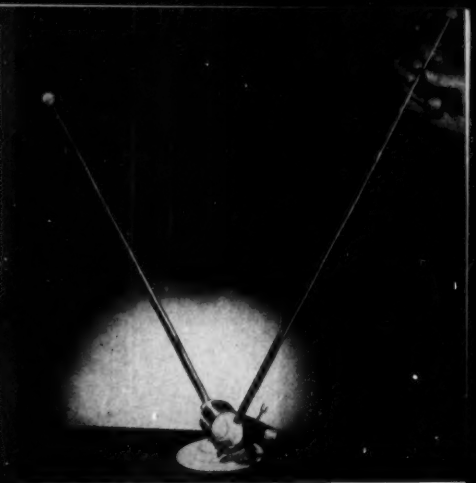
Transparent Covorbols can be used as bowls or can be inverted for use as plate covers to keep leftovers fresh in the refrigerator or to keep food warm on its way to the table. Lustrex or Styron polystyrene is used to mold the bowls, which are available in three sizes: 6, 7½, and 9 inches. A set containing one bowl of each size is also sold in a colorful gift box. Made by New Plastic Corp., 1017 North Sycamore Ave., Hollywood 38, Calif.



PRODUCTS

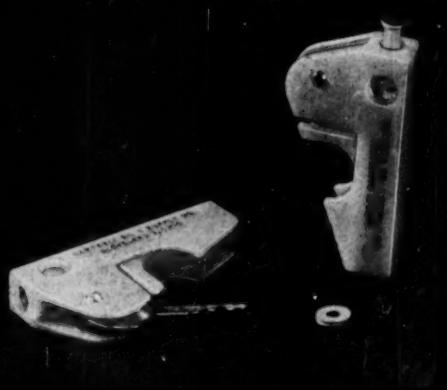


Transparent guards for circular saws of 8 to 20-in. diameter are now being manufactured as standard units. The Plexiglas guards offer as much protective value as metal guards, but do not interfere with visibility. The guard is made in two styles, one for stock up to 3 in. thick, and a double-pivoted type for thicker stock. The transparent acrylic guards are manufactured by Laminated Sheet Products Corp., 259 A St., Boston 10, Mass.



Aerial unit for portable television receivers has base and protective end pieces molded of Plaskon urea formaldehyde. The five urea parts are molded of ivory colored material by Molded Insulation Co., 335 East Price St., Philadelphia, Pa. The aerial is manufactured by Snyder Mfg. Co., 22nd and Ontario Sts., Philadelphia, Pa.

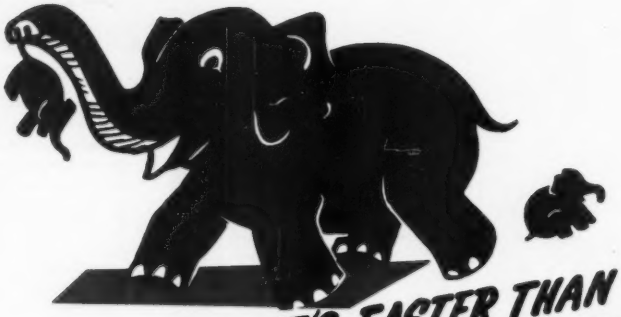
Key case which also contains an accurate tire pressure gage is molded of cream colored cellulose acetate. Magnifying window through which pressure scale is read is molded of Lucite acrylic. Entire unit is only 2⅝ by 1¼ by ½ inches. Plastic parts are molded by Colonial Plastics Mfg. Co., 8107 Grand Ave., Cleveland, Ohio. Case is made by Campbell Oil & Supply Co., 6110 Euclid Ave., Cleveland 3



YOU'LL GET A LAUGH OUT OF THIS . . . (we did)

Midland has been quite proud of its delivery schedule for the past few years and we have, of course, advertised it consistently on these pages for many months. We did get behind on an order from Patent Button Company, Knoxville, Tennessee, and their Mr. Snoddy prepared the advertisement below which is a perfect image of our "cat" advertisement with just a few changes. Our hat's off to Mr. Snoddy for some mighty good copy. P.S. They have their Hobbed Cavities now so we're all set to handle your requirements!

delivery?



AT MIDLAND IT'S FASTER THAN AN ELEPHANT CAN HAVE LITTLE ELEPHANTS!



This wall socket hobbed cavity by Midland incorporates two narrow "T" projections raised 3/16 inches above the cavity surface. By using hobbed cavities of this type in place of the conventional insert cavities, all unsightly parting lines were eliminated and in addition to improving appearance, the hobbing was accomplished at only a fraction of the cost of cavity duplication by machining methods.

Yes, actually! It takes an elephant two long years—but when Midland gives birth to a plastic mold—she seldom stays in labor for more than four or five months. Of course the whole period is longer than that but it is not often that eighteen months is exceeded between conception (of mold design) and delivery.

So if you have a gleaming idea for a molded product, just grab it by the tail and pitch it over to MD&E where delivery is gauged by elephantine standards.

For a clear picture of our equipment and our know how (but not when) write for a copy of "Shaping Tomorrow Some Other Time". Better still, send in your prints—at least two years before you need the tools.

MIDLAND DIE AND ENGRAVING COMPANY
1800 W. BERENICE AVENUE • • • CHICAGO 13, ILLINOIS
Makers of Plastic Molds · Die Cast Molds · Engraved Dies · Steel Stamps · Hobbings · Pantagraph Engraving

MD&E

Plastic Foundry Matchplates

by FRANZ SCHUMACHER†

ALTHOUGH still in its infancy, the use of phenolic resins for the production of plastic foundry patterns or matchplates has already shown remarkable development. In the Cooper foundry, for example, an average of 500 to 800 lb. of phenolic resins are used monthly with resultant savings averaging better than 50% over previous methods.

Among the advantages inherent in the use of plastic patterns are: 1) Low cost duplication of patterns through repeated use of plaster molds for casting plastics. 2) Elimination of finishing requirements since plastic patterns are smooth and dense. 3) Smooth, accurate draws are obtainable because the sand does not adhere to the plastic. 4) Plastic material can be poured at room temperature and cured in a simple, low-temperature oven with a minimum of equipment costs and without fire hazard.

Originally, plastic patterns were cast in full plastic plates. Due to the low ductility of the plastic required for simple casting in plaster molds, the use of a full cast plate offered no economies. Breakage was high and costly, and attempts to mount plastic patterns on wooden boards to get added protection resulted in matching difficulties which reduced economies extensively. With these difficulties to face, the majority of patternmakers have steered clear of plastic patterns.

However, the advantages of plastic patterns made it obvious that if the problems of full plates could be licked, the results would more than justify the expense of the research. A test program was instituted at the Cooper foundry and a practical method was developed for inserting matched integral plastic units into wood or metal plates. This patented "Schumacher Process" eliminates the use of screws or other external fastening devices and combines the strength of wood or metal with a plastic pattern that cannot be mismatched.

Plastic matchplates for casting stainless steel valves, fittings, and engineered castings are now being made on a production basis in accordance with the following numbered operations and appended notes:

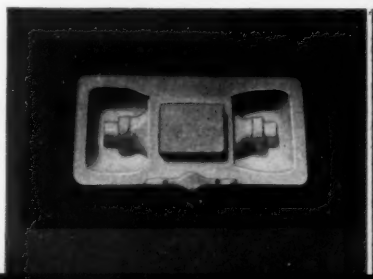
1) *Prepare the master wood or metal pattern.*
Conforming to regular foundry practices, master patterns (split) take shape in the pattern shop. Since the finished casting can be no better than the pattern, the highest type of craftsmanship is essential.

2) *Prepare the flask.*
The flask is usually constructed of two right-angle wood frames and a supporting base plate. The use of right-angle frames with unequal legs permits complete flexibility.

3) *Arrange the pattern in the flask.*
One half of the master pattern is mounted (Sketch 1) on the base plate and then the frames are adjusted to desired size.

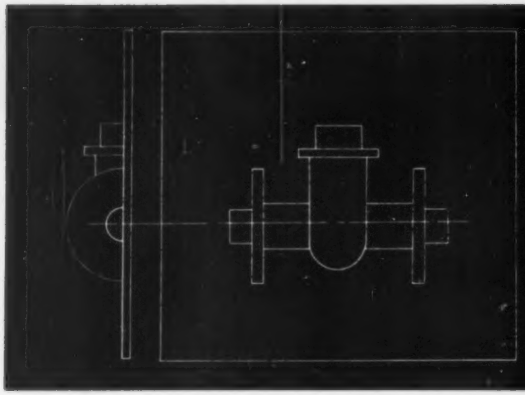
4) *Prepare the plaster of paris mixture.*
[The making of plaster of paris molds is similar in technique to the making of sand molds in the foundry; where the foundryman uses sand and heat-resisting compounds, the patternmaker uses wood and plaster of paris molds for reproduction.]
Plaster of paris, when mixed with water, undergoes

*Reg. U. S. Patent Office.
†Chief Patternmaker, The Cooper Alloy Foundry Co., Hillside, N. J.

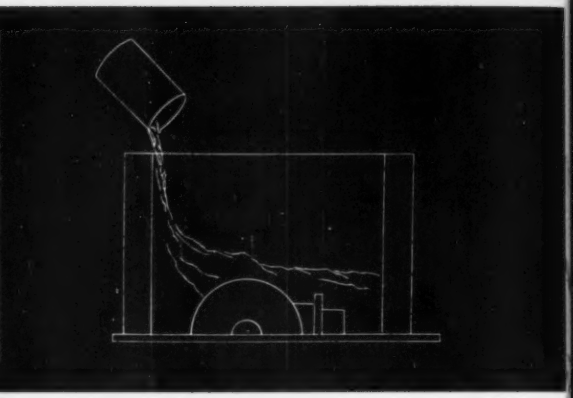




Right: Front view of match-plate inserted in mounting board. Far right: Back view of matchplate



Sketch 1—Left and front elevation of wood or metal pattern mounted on the base plate. Means for pattern part alignment are not shown



Sketch 2—A plaster of paris mixture is poured from side, to avoid bubbles, until it is about 1 in. above high point of the pattern

a chemical reaction during which heat is generated and the fluid mixture changes to a solid. In production, the use of hydrocal A-11, a product of the U. S. Gypsum Co., has been found most satisfactory. Correct consistency in mixing is of prime importance. A good mixture has a smooth texture and the appearance of heavy cream. Usually, a 50-water 50-hydrocal mixture will achieve this. Transparency indicates too much water and not enough plaster.

5) *Apply parting medium.*
To assure facility in separating the pattern and frame from the plaster mold, all portions of contact are coated with a parting agent such as potash, stearic acid, kerosene, or a light lubricating oil.

6) *Pour the plaster of paris.*
In most cases, the plaster of paris is poured from the side (Sketch 2) to avoid formation of air bubbles. Sufficient material is poured to completely cover the pattern and provide at least 1-in. backing support.

7) *Allow the plaster of paris mold to set (slightly) and remove pattern.*
As soon as the plaster of paris starts setting—that is, before the poured plaster of paris develops heat—the pattern should be removed. If this is not done, the heat liberated is likely to expand the wood or metal pattern, and make later removal difficult.

8) *Allow plaster of paris mold to set and dry.*
The drying time of the plaster of paris varies, depending on the thickness of mold. It may be speeded up, however, by the use of low temperature ovens.

9) *Invert and replace pattern.*
After drying, the mold is inverted and the frame is replaced. Both halves of the split pattern are then put together and the pattern is replaced in the mold.

10) *Apply parting medium. See Step 5.*

11) *Pour the plaster of paris (Sketch 3), thus completing impressions for both sides of the split pattern. See Step 6.*

12) *Allow plaster of paris to set (slightly) and remove pattern. See Step 7.*

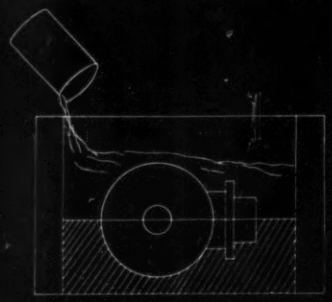
13) *Allow mold to set and dry. See Step 8.*

14) *Seal the plaster of paris mold.*
The completed plaster of paris mold is coated with U. S. Stoneware's Tygon Green Chromate Primer and two thin coats of black Tygon paint to facilitate subsequent removal of cast resin. These two coating agents are essential because they resist the chemical action of polymerization and oven heat, and fill out porous irregularities, producing a smooth, sealed surface that keeps out unwanted moisture and guarantees preservation of the mold for future use.

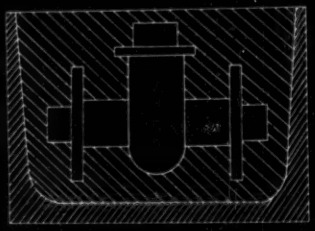
15) *Set up plaster mold with separator.*
The molds are then coated with Johnson's paste wax, reassembled with a three-sided separator (Sketches

Table I.—Physical Properties of Cast Resin Durez 7421A and 5% 7422 (Accelerator)

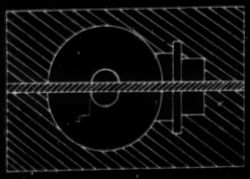
	Baked 8 hr. @ 140° F.
Shrinkage from mold dimension (in. per in.)	0.0025
Rockwell hardness "R" scale	115
Flexural strength, p.s.i.	8000
Modulus of elasticity in flexure	5 to 7 x 10^5
Impact strength, ft.-lb./in. of notch, Izod, A.S.T.M.	0.24
Compressive strength, p.s.i. A.S.T.M.	13,000
Tensile strength, p.s.i.	5000
Water absorption	0.2-0.3%
Linear coefficient of thermal expansion, in. per in. per °F.	0.00005
Specific gravity	1.30
Dimensional change on immersion or humidification	Negligible



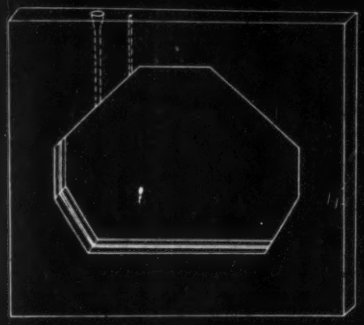
Sketch 3—With complete pattern accurately positioned, plaster is poured for second half of mold



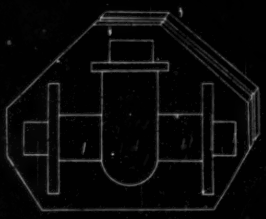
Sketch 4—Lower half of plaster of paris mold showing three-sided separator in place



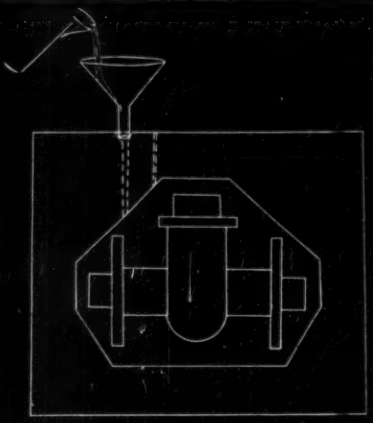
Sketch 5—Cross section of assembled mold with separator in place



Sketch 6—Mounting board with pouring hole, vent hole, and groove ready for the insertion of plastic pattern



Sketch 7—Pattern with matching groove ready for insertion



Sketch 8—Low melting alloy is poured to lock the pattern in mounting board

4 and 5) the thickness of the desired matchplate, and clamped into the original plaster mold frame. (See Step 2).

16) *Prepare the resin.*

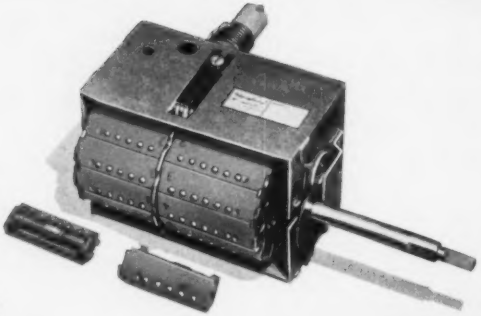
Casting resins are of the phenolic thermosetting type, which can be cast in simple molds without the use of pressure. In general, cold poured plastics are superior and preferred to any form of plastic which is liquified by heating before pouring, because the latter have far greater shrinkage on setting. Polymerization, a chemical action whereby a substance is changed into a compound having the same elements but different physical properties than the original substance, takes place when the resin is blended in the presence of a catalyst. For production work, Durez 7421A casting resin, and 5% Durez 7422 accelerator are used. (See Table I.) The resin and the accelerator are mixed slowly, paying careful attention to keep the agitator completely submerged in the solution to prevent excessive bubbling. Between the mixing and the pouring, a period of 15 to 30 min. should elapse.

17) *Pour the resin.*

To avoid subsequent pores in the finished casting, extremely slow pouring into the mold is recommended. It is good practice to pour an excess on top of the mold to trap any remaining bubbles.

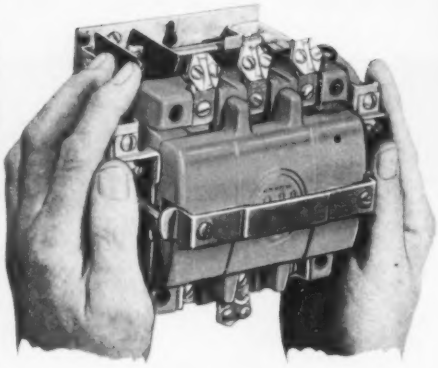
18) *Allow the resin to set; then cure in oven.*

(*Please turn to page* 100)



In "The Standard Television Tuner" extreme accuracy is of the utmost importance. Tolerances of molded Plaskon Alkyd parts used by *Standard Coil Products Company* are held as low as .0005". These Plaskon Alkyd parts were molded by *Wilcox Plastics.*

LOOK HOW INDUSTRY HAS SWUNG TO PLASKON ALKYD



In grueling interrupting current tests for arc resistance, Plaskon Alkyd withstood twice the current of the next best plastic. At that point, this starter motor, made by *The Arrow-Hart and Hegeman Electric Company,* still operated satisfactorily.

Sangamo Electric Company set a new, high production molding record with Plaskon Alkyd when molding capacitor and time switch terminal blocks. A Sangamo official said, "This speed really shows up where it counts the most—in savings."

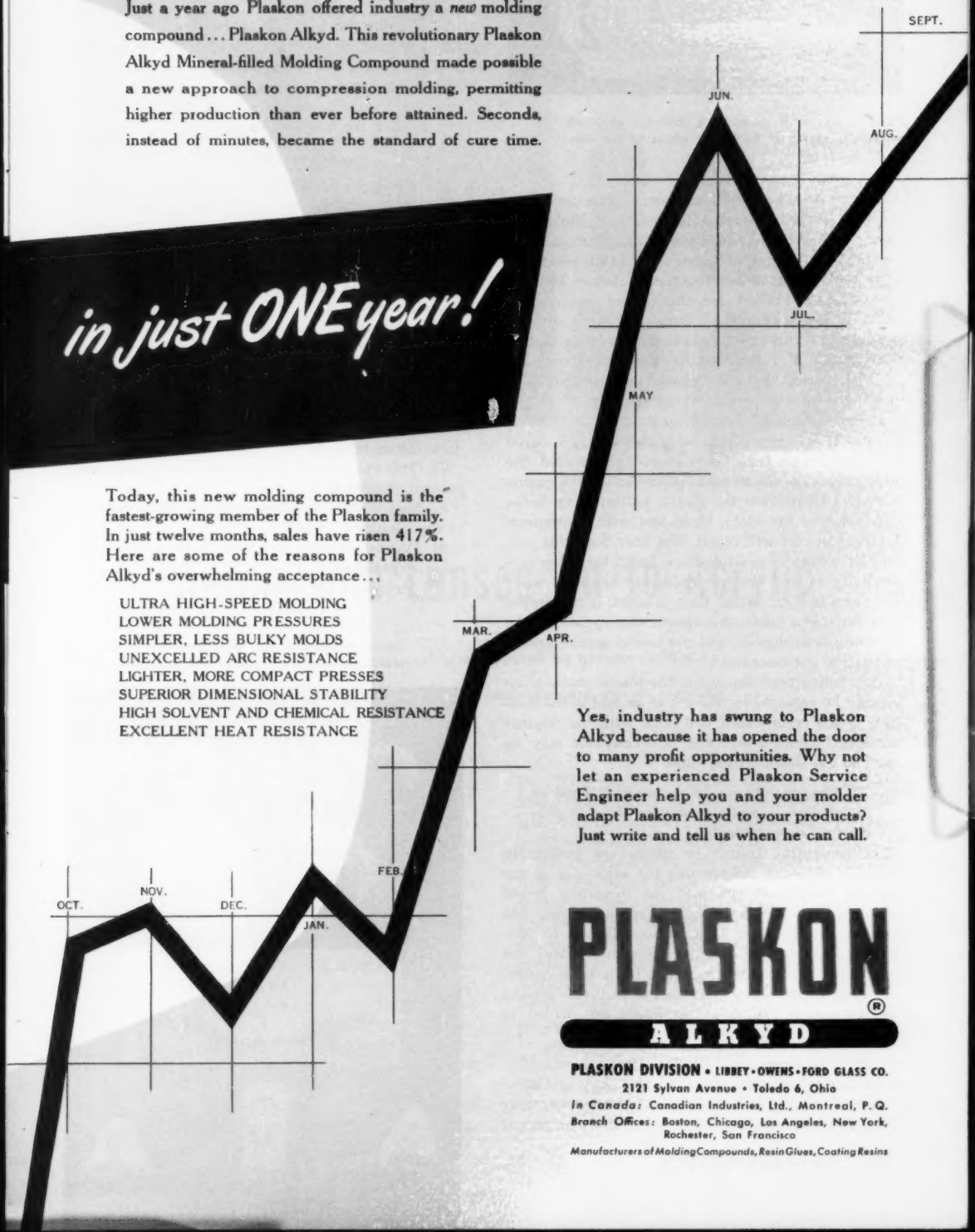


Partial List of Applications for PLASKON ALKYD

CAPACITORS
COILS
CONDENSERS
CRYSTAL ADAPTORS
DISTRIBUTOR HEADS
ELECTRICAL CONNECTORS
ELECTRICAL INSULATORS
FUSE PLUGS
LIGHTING
METER PARTS
SPEEDOMETER PARTS
SWITCH BASE
TELEVISION TUNERS
TELEVISION TUBE BRACKETS
TERMINAL PLUGS
TUBE BASES
WIRING DEVICES

Just a year ago Plaskon offered industry a *new* molding compound... Plaskon Alkyd. This revolutionary Plaskon Alkyd Mineral-filled Molding Compound made possible a new approach to compression molding, permitting higher production than ever before attained. Seconds, instead of minutes, became the standard of cure time.

in just ONE year!



Today, this new molding compound is the fastest-growing member of the Plaskon family. In just twelve months, sales have risen 417%. Here are some of the reasons for Plaskon Alkyd's overwhelming acceptance...

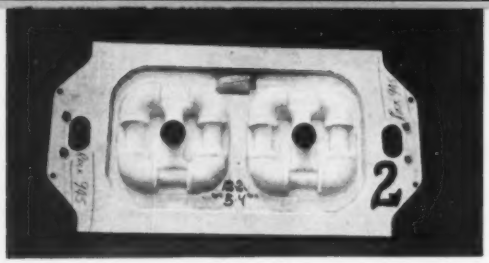
ULTRA HIGH-SPEED MOLDING
LOWER MOLDING PRESSURES
SIMPLER, LESS BULKY MOLDS
UNEXCELLED ARC RESISTANCE
LIGHTER, MORE COMPACT PRESSES
SUPERIOR DIMENSIONAL STABILITY
HIGH SOLVENT AND CHEMICAL RESISTANCE
EXCELLENT HEAT RESISTANCE

Yes, industry has swung to Plaskon Alkyd because it has opened the door to many profit opportunities. Why not let an experienced Plaskon Service Engineer help you and your molder adapt Plaskon Alkyd to your products? Just write and tell us when he can call.

PLASKON®

ALKYD

PLASKON DIVISION • LIBBEY • OWENS • FORD GLASS CO.
2121 Sylvan Avenue • Toledo 6, Ohio
In Canada: Canadian Industries, Ltd., Montreal, P. Q.
Branch Offices: Boston, Chicago, Los Angeles, New York, Rochester, San Francisco
Manufacturers of Molding Compounds, Resin Glues, Coating Resins



Plastic matchplate for producing a sand mold which will permit the casting of eight pipe elbows at one time

After pouring, the resin becomes opaque and gelatinous as it sets at room temperature. Molds are then cured to the manufacturers' specifications.

Simple ovens can be constructed of plywood and lined with sheets of asbestos for insulation. Heating elements best suited for the curing are electric bulbs or bars produced by General Electric. A very good general rule to follow is to allow approximately 8 hr. at 140° F. for curing. After approximately 1½ to 2 hr. curing time, the plastic pattern should be taken out of the plaster of paris mold.

It should then be replaced in the oven for further curing. This is important, for if the plastic is cured for the 8 hr. while in the plaster of paris mold, the little shrinkage which takes place during the curing process will prevent the plastic pattern from being taken out of the mold. Mold loss with subsequent increase in cost will result. Not only does this precaution eliminate mold damage, but it increases productivity as well because molds can be made ready for reuse in 2 hr. rather than in eight. If the proper care has been taken throughout the operation, the finishing is negligible, and the use of special grades of tools is not essential.

Any subsequent damage to the plastic pattern can readily be repaired by the use of an additional mixture of the resin which will bond with the original pattern. Increased amounts of accelerator may be used to cut down curing time.

19) *Prepare the mounting board.* [*Wood or metal plates may be used, depending on production requirements.*]

Wood mounting boards or plates are preferably made of plywood. An opening the same size as the pattern outline is cut into the mounting board (Sketch 6). When metal plates are used, they are cast in aluminum and the cut-out is cast to size. The outside of the pattern (Sketch 7) and the inside of the plate are grooved 1/16 in. by a router. A pouring hole and a vent hole to facilitate sealing the pattern in the mounting board are drilled to the groove.

20) *Prepare the low melting alloy.*

Low melting alloys, such as Wood's alloy or Cerrobend are recommended for this type of work; their easy rate of flow and minimum shrinkage permit their uses where close cast fits are required. Plastics and other similar materials can be used, but not as economically or conveniently.

21) *Pour the low melting alloy.*

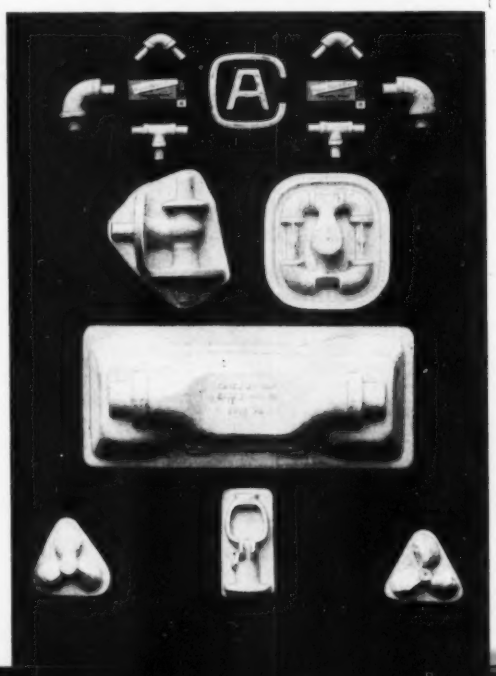
The low melting alloy is poured into the pouring hole (Sketch 8) and flows around the precut groove. The vent hole permits an escape for air or gas which might otherwise be caught along the locking groove and weaken the matchplate.

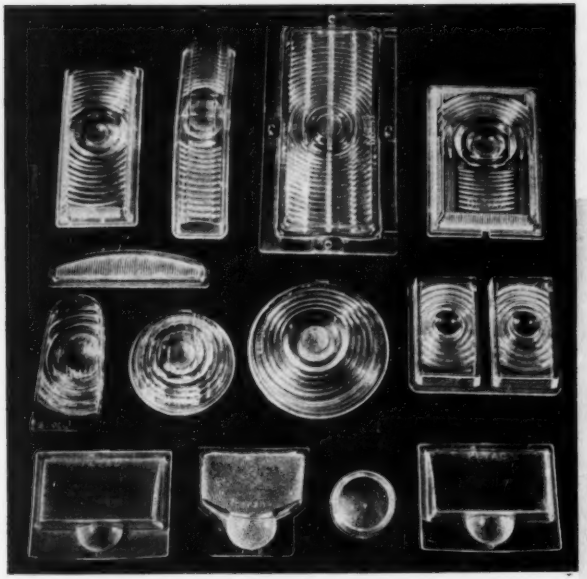
Advantages found

On the basis of 2½ yr. on production pattern work, it is possible to list the major advantages which have accrued through the use of the Schumacher Process:

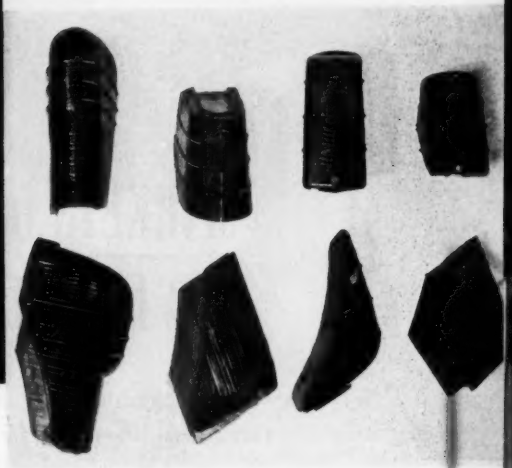
1) Savings in cost range between 50 to 75 percent.
2) Individual broken patterns on a matchplate may be replaced at low cost.
3) Duplicate matchplates may be made in from 2 to 5 hours.
4) Precision matching of patterns may be accomplished with minimum of care.
5) No shifting of patterns is possible.
6) No expensive equipment is required to produce the matchplate.
7) Only one pattern is needed to produce multiple pattern matchplates.
8) Easy withdrawal from sand due to smoothness of the plastic.
9) Matchplates can be made by men with minimum experience.
10) Extensive elimination of cores.

Typical examples of cast phenolic patterns showing the wide range of products possible with plastic matchplates





1—Clear acrylic lenses in varied shapes range upward from the small 1½-in. map light unit



2—Used mainly for tail lights, red lenses go up to 6½ in. high, 3¾ in. long, and 2 in. wide

Automobile Lenses Go to Acrylic

Higher material cost is discounted by greater brilliance, resistance to breakage, and superior color stability

AFTER intensive laboratory investigation and engineering development, acrylic has captured a large part of the automotive lens market. In the entire 1949 Chrysler lines, all lenses, with the exception of those used on the sealed-beam headlights, are made of injection molded acrylic. The Chrysler line—which includes Plymouth, Dodge, De Soto, and Chrysler cars—requires more than 50 different lenses ranging in size from small 1½-in. diameter clear lenses for the map light up to red tail light lenses as large as 6½ in. high, 3¾ in. long, and 2 in. wide. Groups of lenses for the Chrysler line are shown in Figs. 1 and 2. General Motors has converted many of its lenses from glass to acrylic; Kaiser-Frazer, Nash, and Crosley have replaced some glass lenses with acrylic.

Three of the molders presently engaged in producing acrylic lenses for automobiles are: Bay Mfg. Div., The Electric Auto-Lite Co., Bay City, Mich.; Stimsonite Plastics, Div. of American Gas Accumulator Co., Chicago, Ill.; and Guide Lamp Div., General Motors Corp., New York, N. Y.

When experimental acrylic lenses were first made, they were found to be superior to glass lenses in brilliance. Also, they did a good job without breakage and without the continual replacement of molding equipment as is necessary when working with glass. With these advantages, engineers naturally started to figure the possible use of acrylics for various types of lenses. While they realized that the initial material pound cost was lower for glass than for acrylics, they saw the possibility of reducing the thickness of lenses and of saving material through the use of lighter lamp and lens housings. Furthermore, with the breakage problem almost completely

(*Please turn to page* 104)

Millions and millions of people saw the advertisement across the way in such publications as *Saturday Evening Post, House & Garden, New York Times Sunday Magazine, Newsweek* and *Farm Journal*. It is part of a six-month Cyanamid promotion to help build bigger markets and profits for molders of MELMAC dinnerware.

American Cyanamid Company offers you every possible cooperation in developing markets for MELMAC or BEETLE molded products, too.

MARKETS for MELMAC Plastic will last a long time, too...

Yes, MELMAC plastic stands up... and so do the markets that MELMAC makes.

For instance, the market for MELMAC dinnerware.

Cyanamid has been giving MELMAC dinnerware *promotion after promotion* ...backing up molders with every effort to build this market.

Consider Cyanamid's current 6-month promotion to build distribution and consumer demand for MELMAC dinnerware.

Two-page, two-color spreads ran in the July, August and September issues of *Crockery & Glass Journal* and *Department Store Economist*—making nearly 100,000 impressions on key retail store executives, merchandise managers and buyers. And this was backed up by a series of direct mail pieces (samples of which were sent to all molders of MELMAC dinnerware and their sales representatives).

More than *30 million* consumer impressions are being made by full-color, full-page MELMAC dinnerware advertisements in September, October, November and December issues of such publications as *Saturday Evening Post, House & Garden, New York Times Sunday Magazine, Newsweek* and *Farm Journal*.

In addition, this Cyanamid promotion included sales kits for distribution to retail outlets (via molders and their dealers)—kits that contained *every* kind of helpful sales promotion material for retailers.

If *you* have any thought of marketing products molded of Cyanamid thermosetting plastic materials—MELMAC or BEETLE—whether these products are in the production or idea stage—you, too, can count on Cyanamid's full cooperation all along the line.

Think about it, won't you—and then consult us, in complete confidence.



"We'll keep these a long time, Mommy!"

MELMAC* DINNERWARE MAKES FRIENDS!

The gracious, friendly atmosphere that MELMAC dinnerware helps create, during and after meals, remains unbroken . . . thanks to MELMAC's unbelievable resistance to breaking. (Proven during years of hard, steady use in leading hotels and restaurants.) This specially developed plastic material makes you throw away *all* your old ideas about plastic dishes. When you see its obvious quality, its molded-in colors; when you learn how long it lasts; when you experience the way it feels and handles . . . so easy, so *safe* to wash by hand or machine . . . you won't be surprised that MELMAC dinnerware costs a little more. It's being sold at leading stores everywhere. If your favorite sources for fine dinnerware do not have it yet, let us know . . . we'll direct you. American Cyanamid Company, Plastics Department, 32 Rockefeller Plaza, New York 20, N. Y. *®



MELMAC dinnerware

Smart To Buy . . . Smart To Use

"Goodness! It's hard to break!" Yes, that's the wonderful thing about MELMAC dinnerware. It *is* unbelievably resistant to breaking, cracking and chipping. MELMAC's lovely colors are molded in from surface to surface. Its finish and "feel" is like finest china. *So* easy to wash by hand or machine. (Your hottest dishwater won't harm MELMAC.)



3—Tail light lenses weighing 4½ oz. are among the largest made. They are produced in the two-cavity mold shown in press

PHOTOS ON PAGES 104 AND 105 COURTESY DETROIT MOLD ENGINEERING CO.

solved, gasketing cost could be reduced materially.

The use of acrylic for automobile lens applications entailed considerable capital investment for new molds. Also, since the cost per part is higher for acrylic, the automotive engineers, designers, and stylists had to present convincing reasons for sweeping changes before approval could be obtained from management. This was done by proving that the following advantages would be obtained through the use of acrylic:

1) Color stability of the new lenses is superior to their glass counterparts.

2) They deliver a higher candle-power.

3) They are practically unbreakable (the mortality of glass lenses during shipment, handling, and assembly was sometimes as high as 30 percent).

4) Special types of refracting surfaces, impractical in glass, were made possible.

5) Dimensional accuracy was assured throughout the entire production line.

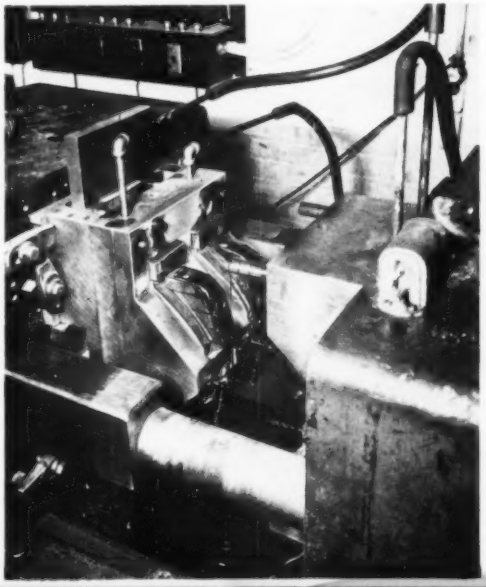
6) Simple and inexpensive "snap-in" assemblies were made possible by the flexibility of the acrylic.

Whenever major change-overs are made in automotive models, production timing is of the utmost importance. Failure of any parts supplier to deliver on schedule can completely disrupt operation of an automobile assembly line. In order to expedite the construction of the large number of molds required for this program, molders resorted to the use of standard mold bases manufactured by Detroit Mold Engineering Co., Detroit, Mich. The use of these bases was not a sudden inspiration, but stemmed from the fact that molders have used them for many years, not only to reduce the time required for mold completion but also to save as much as 20% in mold costs.

Beryllium copper cavities

The use of pressure cast or hot hobbed beryllium copper cavities for many of the lens molds was another important factor in the fast completion of contracts. The intricate design of a number of the lenses could have been reproduced by hobbing in steel but the cavities would have been more costly and

4—Four-cavity mold mounted on standard mold base produces 2½-oz. tail lights. Total shot weighs 11½ ounces



production would have been more time consuming.

The list of lenses would obviously be too long to include here. However, mention of two of the largest of the lenses and of an ingenious hinged mold design will serve to point up that portion of the work that was under way at Electric Auto-Lite during a recent visit by a MODERN PLASTICS editor.

At that time, a large 4½-oz. tail-light lens for the Plymouth car was produced by a two-cavity mold in a 22-oz. Watson-Stillman machine (Fig. 3.)

A four-cavity mold in a 12-oz. Watson-Stillman press was producing tail-light lenses for Dodge cars. (Fig. 4.) Each of these lenses weighs 2½ oz. and the weight of the total shot was 11½ ounces.

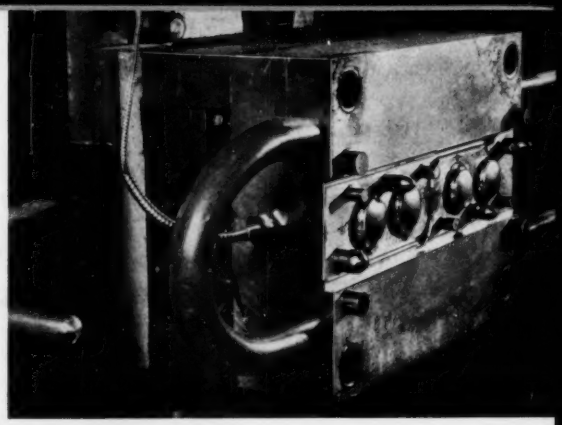
Four-cavity hinged mold

A small circular lens for the map light on Chryslers was being made in an interesting four-cavity mold. The design of this lens included a deep undercut groove around the outside. A cam action mold could have been built to produce these parts but the cost would have been much higher than the simple one which was devised by Electric Auto-Lite. The forces and cavities were similar to those which would have been used in a cam action mold. However, that portion of the mold for producing the undercuts was machined into two plates which were hinged at one end. Four locating dowels were set into the force plate so that mating holes in the hinged plates (two each) would match perfectly with the dowels. The force plug half of the mold is shown in Fig. 5 without the hinged plate assembled. The locating dowels are the four rounded end pins.

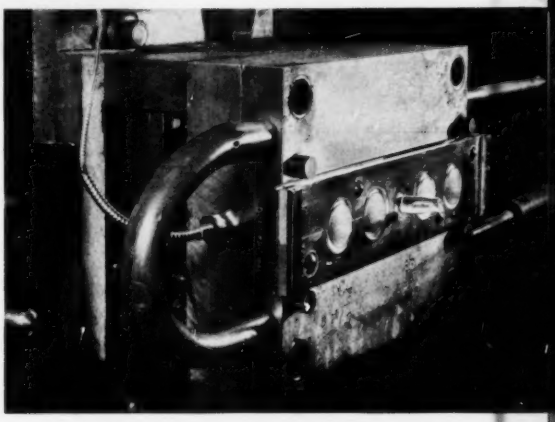
Figure 6 shows the removable plates in the molding position with a complete shot of lenses still in the mold. Since the runner grooves are machined in the main portion of the mold, the runners and gates cannot be seen in this picture. To remove the molded parts the operator merely pushes the plates off the locating dowels and separates the two halves (Fig. 7) and removes the shot.

The simplicity of this type of mold design as compared with any other for producing this kind of an undercut points to the common sense type of engineering which is prevalent in Electric Auto-Lite's plant. The interesting part of this particular hinged mold set-up is that it works with far less trouble than would have been found if a cam-action mold had been used.

This brief description of acrylic lenses indicates the results that can be achieved when the advantages of plastics are seriously investigated. It further proves that plastics do not always replace some other material for purposes of dollar economy. In this case, acrylic replaced glass because, despite higher piece cost, the plastics material would do a better job than the material it supplanted—enough better to overcome its original cost disadvantage.

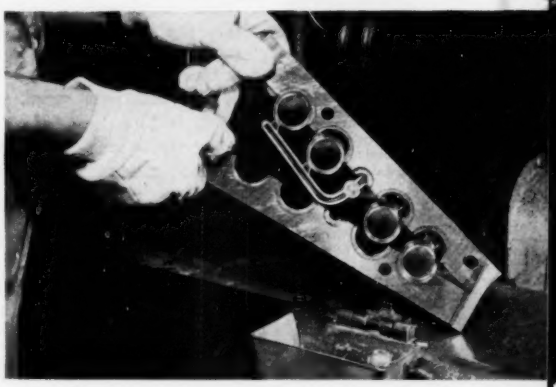


5—Force plug half of mold, without hinged plate assembled, for producing map light lenses with undercuts



6—Still in the mold is a complete shot of acrylic map light lenses. Removable plates are in molding position

7—Mold design simplicity: push the plates off locating dowels, separate two halves, and remove the molded shot

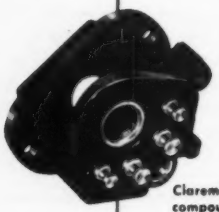




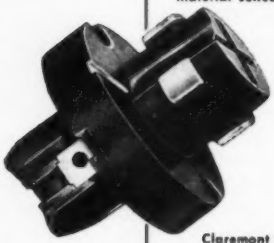
CLAREMONT

Cotton-Filler

STRENGTH



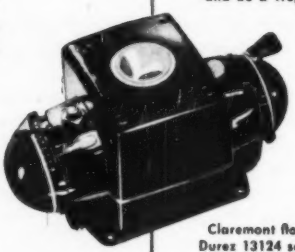
Claremont flock-filled compound molded as Bearing Bridge. Excellent example of selecting material suited to the need.



Claremont flock-filled Resinox 3941 gave this Connector the strength to meet the specs and do a Trojan's job

Steels plastic formulations against shock and breakage!

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Effect of Outdoor Exposure on Plastics

by JOHN K. LONG†

THE increasing use of plastics as exterior parts has made it of interest to study the deterioration of these materials on outdoor exposure, especially with regard to the effect on strength properties. Very little information is available on the effect of outdoor exposure on the mechanical properties of plastic materials. In the present report some test results are given showing the change in some of the strength characteristics of various plastics and plastic laminates after outdoor exposure, as well as changes in warp, twist, and surface appearance.

A considerable decrease in flexural strength properties was observed for a phenolic high-strength-paper laminate and for urea-formaldehyde cotton and glass laminates after exposure. Aside from these instances, the flexural strength properties of the phenolic and polyester materials tested were only slightly affected. None of the ethyl cellulose materials decreased in flexural or impact strength after exposure, but one ethyl cellulose panel decreased in flexural modulus of elasticity. The cellulose acetate and cellulose acetate butyrate materials maintained their flexural strength but decreased in impact strength. A limited number of accelerated weathering and water immersion tests were also performed for determination of the effects of these types of exposure on strength properties.

Materials

The materials consisted of ⅛ in. nominal thickness flat sheets from which panels approximately 12 by 15 in. in size were cut for exposure. All panels for exposure were cut from a single original sheet of material except in the case of the thermoplastics, where three similar sheets were used. The following types of materials were included:

(a) Thermoplastics (cellulose derivatives). Unfilled except for one cotton fabric base ethyl cellulose laminate.

(b) Cotton and glass fabric laminated with polyester resins, contact or low pressure types.

(c) Cotton and paper laminated with high and medium pressure phenolic resins.

(d) Glass fabric laminated with a low pressure phenolic resin.

(e) Cotton and glass fabric laminated with a low pressure urea-phenol-formaldehyde resin.

The glass fabrics in the panels were used as woven with the starch-oil standard lubricant remaining on the glass, except sample No. 13, for which heat-treated glass fabric was used. The materials are described in Table I.

As a matter of information, further weathering tests are now in progress on laminates made with currently used types of polyester resins and employing glass fabric heat-cleaned and sized with a water repellant finish (finishes 113 and 114).

Exposures and tests

A panel of each material was exposed at an angle of 45° to the horizontal facing south at Chapman Field, near Miami, Fla., for 11 months. Duplicate panels were exposed at 30° to the horizontal facing south in Dayton, Ohio, weather for 11 months, at which time their appearance, warp, and twist were recorded. The Dayton panels were then exposed to another 18 months of Dayton weather after which final warp and twist and strength tests were made. The exposure racks in all cases were of wood. About 2 in. at each end of the sample were inserted in slots in the exposure racks but not rigidly clamped, leaving 12 in. exposed. All specimens were taken from the exposed area without using edge material.

Samples Nos. 3 and 19 in the as-received condition were exposed in the form of machined test specimens to 240 hr. of accelerated weathering for comparison with actual outdoor weather exposure. The accelerated weathering exposure was performed in accordance with Federal Specification L-P-406a, method 6021 (Sunlamp-fog type). (*Turn the page*)

*Reg. U. S. Patent office.
†Materials Laboratory, Engineering Div., Air Materiel Command, Wright-Patterson Air Force Base.

Table I.—Description of Materials

1. No. 0-6000, white, opaque, F11513-A125/AA, Lumarith, cellulose acetate, Celanese Corp. of America.

2. Tenite II, 205A-12605-MH clear, cellulose acetate butyrate, Tennessee Eastman Corp.

3. Yellow transparent plastic Q-106 Ethocel LT, light stabilized ethyl cellulose, Dow Chemical Co. Molded at 350° F., 1500 p.s.i.

4. No. R6000 white opaque, F22 512-125/AA, ethyl cellulose, Celanese Corp. of America.

5. No. R2165 black opaque, F22 490-125/AA, ethyl cellulose, Celanese Corp. of America.

6. Resin: 8 parts ethyl cellulose, 20 parts tricresyl phosphate, 1 part stabilizer, 1 part carbon black. Filler: 4 plies of 8-oz. drill pretreated with a solution of the plastic. Molded by Hercules Powder Co., at 350° F., 750 to 1000 p.s.i. 72% resin content.

7. Resin: Laminac P-4122 polyester, American Cyanamid Co. Filler: 2 plies #360 cotton sheeting and 3 plies 11-oz. duck, cross laminated. Molded by United States Rubber Co., at 230° F., 14 p.s.i. 63% resin content.

8. Resin: CR-39 polyester. Filler: 6 plies of 8-oz. duck "E" laid up parallel to each other. Molded by Pittsburgh Plate Glass Co. at 176 to 239° F., ½ p.s.i. 66% resin content.

9. Resin: Plaskon 900, polyester. Filler: 10 plies 5-oz. unbleached muslin, parallel laminated. Molded by Plaskon Div., Libbey-Owens-Ford Glass Co., at 212° F., 50 p.s.i. 60% resin content.

10. Resin: P4122, polyester, American Cyanamid Co. Filler: 6 plies of ECC-162 Fiberglas fabric, cross laminated. Molded by United States Rubber Co. at 230° F., 14 p.s.i. 50% resin content.

11. Resin: Marco Chemical Co. MR-1A, polyester. Filler: 6 plies ECC-11-162, cross laminated. Molded by Swedlow Aeroplastics Corp. at 90° F., 14 p.s.i. 46% resin content.

12. Resin: CR-39, polyester. Filler: 7 plies ECC-11-162 Fiberglas fabric. Surface plies, ECC-11-108. Molded by Pittsburgh Plate Glass Co. at 176 to 239° F., ½ p.s.i. 49% resin content.

13. Resin: Plaskon 900, polyester. Filler: ECC-11-112 Fiberglas fabric, heat treated, 40 plies, parallel laminated. Molded by Plaskon Div., Libbey-Owens-Ford Glass Co., at 212° F., 40 p.s.i. 45% resin content.

14. Resin: Phenolic, grade L, Federal Specification HH-P-256. Filler: cotton fabric. Molded by Formica Insulation Co. at 1000 p.s.i.

15. Resin: BV 16238, phenolic. Filler: 8-oz. Exeter P-18 boot duck. Molded by Bakelite Corp. at 300° F., 250 p.s.i. 55% resin content.

16. Resin. Phenolic, grade XX, Federal Specification HH-P-256. Filler: paper. Molded by Panelyte Div., St. Regis Paper Corp., at 1000 p.s.i.

17. Resin: Bakelite 16256, phenolic. Filler: 56 layers of treated high strength paper, Specification 21, using A-19 aircraft paper and treating formula T-14. Molded by Consolidated Water Power and Paper Co. at 250 p.s.i. 33% resin content.

18. Resin: Plaskon 800-12, phenolic. Filler: ECC-11-162 Fiberglas fabric, 8 plies cross laminated at 90°. Molded by Plaskon Div., Libbey-Owens-Ford Glass Co., at 290° F., 50 p.s.i. 45% resin content.

19. Resin: Plaskon 700-2, urea-formaldehyde fortified with phenolic. Filler: 8-oz. cotton fabric for surface plies, 3 plies 18-oz. canvas for core, cross laminated at 90°. Molded by Plaskon Div., Libbey-Owens-Ford Glass Co., at 220° F., 50 p.s.i. 49% resin content.

20. Resin: Plaskon 700-2, urea-formaldehyde fortified with phenolic. Filler: ECC-11-162 Fiberglas fabric, 8 ply, cross laminated at 90°. Molded by Plaskon Div., Libbey-Owens-Ford Glass Co., at 220° F., 50 p.s.i. 47% resin content.

Materials Nos. 2, 3, 6, 11, 18, 19 and 20 were also tested for strength properties wet after machined test specimens had been immersed in water for 24 hr. at room temperature.

After each condition of exposure the panels were examined for any increase in warp and twist and for any change in appearance. Specimens for bend, compression, tension, and impact strength determinations were cut from the exposed panels and the test results compared with the test results obtained for the original materials. Meanwhile, the unexposed panels for comparison tests had remained in the laboratory atmosphere until the exposure tests were complete. Comparison of the results for exposed and unexposed panels therefore neglects the effect of aging the unexposed panels. All specimens were taken in the longitudinal or warp direction of the materials. In the case of the unfilled materials, an arbitrary direction was chosen and all specimens cut in the same direction. Flexural tests were performed on every material and impact strength was determined in the case of all the thermoplastics. Tension and compression tests were also made for some of the materials. Tests were performed according to Federal Specification L-P-406a. Specimens were allowed to come to equilibrium with the laboratory atmosphere, 77° F. and 50% relative humidity, before testing.

After exposure many of the materials were somewhat warped. For the sake of uniformity of testing, flexural tests on these panels were performed with the concave side in compression. The weathered side was concave in all cases where warp occurred. Warp and twist were measured in accordance with method 6051, Federal Specification L-P-406a.

Results and discussion

The results of flexural tests as received and after weathering are compiled in Table II. Because of the use in some cases of several different sheets of material, variations in properties within a given sheet, the warp of exposed panels, and variations due to experimental testing, differences of the order of 10% between properties determined on specimens unexposed and after weathering are not regarded as significant. From the table it is evident that outdoor exposure has no significant effect on the flexural strength properties of most of the cotton or glass fabric base polyesters, the cotton fabric base phenolics, the high pressure paper base phenolic or most of the thermoplastics. The medium pressure paper base phenolic, (No. 17), the glass fabric base low pressure phenolic, (No. 18), and the urea-phenol-formaldehyde cotton and glass laminates, (Nos. 19 and 20), all decreased in flexural strength from 25 to 45% and in flexural modulus of elasticity from 20 to 50 percent. Sample No. 3, an ethyl cellulose sheet, decreased about 40% in flexural modulus of elasticity. (*Please turn to page* 110)



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Table II.—Flexural and Impact Strength Properties Unexposed and After Outdoor Exposure

Sample No. and description	Unexposed			11 months Florida			29 months Dayton			24 months Washington (Ref. 1 and 2)	
	Flexural strength	Flexural modulus of elasticity	Impact strength, Izod notched	Flexural strength change	Flexural modulus of elasticity change	Impact strength change	Flexural strength change	Flexural modulus of elasticity change	Impact strength change	Flexural strength change	Flexural modulus of elasticity change
	p.s.i.	10^6 p.s.i.	ft.-lb./in. of notch	%	%	%	%	%	%	%	%
1. Cellulose acetate	9800	0.401	1.61	—18	—3	—36					
2. Cellulose acetate butyrate	5570	0.215	2.19	+10	—6	—66	+5	0	—58		
3. Ethyl cellulose	4800	0.166	2.85	+11	—42	+3	+9	—42	+10		
4. Ethyl cellulose	7700	0.310	2.73	—6	—1	—12					
5. Ethyl cellulose	6790	0.251	3.09	+1	+12	—5					
6. Cotton fabric base, ethyl cellulose	3630	0.181	6.6	—11	+14						
7. Cotton fabric base, polyester	7130	0.482		—13	+1		—4	+1			
8. Cotton fabric base, polyester	7190	0.510		—7	—4		—13	—8		—20[b]	+2[b]
9. Cotton fabric base, polyester	10300	0.641		—9	—33		+1	—18			
10. Glass fabric base, polyester	16600	0.630		+23	+32		+9	+16			
11. Glass fabric base, polyester	25000	1.75	26.9	+18	+8		—9	—10		—3	—7
12. Glass fabric base, polyester	20100	1.69		+20	—8		+6	—10			
13. Glass fabric[a] base, polyester	39800	2.26		—8	—10		—16	—10			
14. Cotton fabric base, phenolic	20300	1.16		—3	+1		—14	+6		—18[b]	—22[b]
15. Cotton fabric base, phenolic	17700	1.03		—5	—12		—10	—12			
16. Paper base, phenolic (high pressure)	11600	1.16		+17	—1		+13	—4			
17. Paper base, phenolic (medium pressure)	34000	3.32		—25	—25		—28	—20		—35	—29
18. Glass fabric base, phenolic	19200	1.66	12.24	—20	—28		—40	—52			
19. Cotton fabric base, urea-phenol-formaldehyde	9620	0.577	4.5	—44	—39		—37	—41			
20. Glass fabric base, urea-phenol-formaldehyde	13500	1.42	32.3	—25	—44		—32	—51			

[a] Heat-treated fabric. Other glass fabrics laminated "raw".
[b] Tests of similar but not identical materials were reported in references 1 and 2.

Impact strength of the thermoplastic materials was felt to be of interest because of the effect which loss of plasticizer might have on this property. The results given in Table II indicate that the cellulose acetate (No. 1) and cellulose acetate butyrate (No. 2) lost considerable impact strength on exposure, but the ethyl cellulose sheets (Nos. 3, 4, and 5) were not affected appreciably.

Table III illustrates the effect of the accelerated weathering exposure on materials Nos. 3 and 19. Material No. 3, an ethyl cellulose sheet, showed no increase in ultimate flexural strength as a result of accelerated weathering as compared with a 10% increase after outdoor exposure, but the flexural modulus of elasticity for this material shows no

(*Please turn to page* 152)

Vinyl Plastisol Compounding

by W. D. TODD*

THE market acceptance for vinyl paste resins since their commercial introduction several years ago has been paced by the creation of new uses, advances in plastisol techniques, and the attainment by processors of greater economies in production. Vinyl paste resins are used today as fluid dispersions adaptable to compounding in a wide range of viscosities for a variety of coating and molding applications. Processors have adopted the plastisol technique in the manufacture of supported and unsupported films, protective coatings, indestructible toys, and prosthetic devices, and have realized lower production costs as a result.

Simple plastisols

A simple plastisol is composed basically of paste resin and plasticizer. These two are required for a fluid vinyl composition and all other ingredients may be considered as modifiers.

The mixing of paste resin and plasticizer may be accomplished in standard type mixers, illustrative of which is the Pony mixer. The principal requirement for a well mixed plastisol, and one that cannot be emphasized enough, is a high degree of shearing. In mixing, it is well to start with most or all of the resin and just sufficient plasticizer to make a fairly heavy consistency paste. The balance of the resin is then added. When all the resin is wetted and thoroughly dispersed, the remaining plasticizer is added slowly. An hour's mixing after the additions are completed is normally ample time. Dependent upon the composition of the compound, caution should be exercised to prevent too great a temperature rise during mixing as this results in a higher paste viscosity after the plastisol has cooled to room temperature.

*Development Engineer, B. F. Goodrich Chemical Co.

Table I.—Properties of Simple Plastisols

Geon 121, parts	100	100	100	100	100	100
GP 261[a], parts	100	90	80	70	60	50
Durometer A hardness	62	65	68	74	81	88
Tensile strength, p.s.i.	1900	2000	2250	2400	2750	3100
Elongation, %	440	425	375	340	300	250
Graves tear, lb./in.	280	330	360	410	450	490
Apparent viscosity[b] at 25° C.						
½ hr., cp.	800	1000	1700	3500	7500	15,000
2 weeks, cp.	2600	3000	5200	12,000	22,000	55,000
Plastic viscosity[c] at 25° C.						
½ hr., cp.	1200	1600	2400	4000	8000	24,000
2 weeks, cp.	1800	2400	3700	6400	12,000	35,000

[a] GP 261 Plasticizer (B. F. Goodrich Chemical Co.).
[b] Apparent viscosity.—Falling cylinder viscometer.
[c] Plastic viscosity.—Precision Interchemical rotational viscometer.

Geon Resin 121 has been designed so that plastisols prepared from it need not be ground. The resin is finely divided, easily wetted by plasticizer and makes a smooth paste if it is efficiently mixed. Ball milling or ink milling is not necessary. Moreover, local overheating produced in a grinding operation, usually results in an increased paste viscosity.

Where thick sections are to be produced or when an exceptionally clear film is wanted, the entrapment of small quantities of air in a plastisol may produce imperfections in the fused product. In these cases, the plastisol should be deaerated by subjecting it to a vacuum in either the mixing or a subsequent step. Deaeration may be accomplished during mixing by using a closed system such as the Baker-Perkins mixer connected to a source of vacuum. If the deaeration is to be done after mixing, any arrangement which will expose thin films of paste to a reduced pressure will remove most of the entrapped air. A vertical tank under vacuum into which the paste enters through a shower head or through which it flows over baffles is an example. If large quantities of paste are to be processed, commercial units are available which will provide a continuous means of deaeration.

The paste fusion step should be mentioned because of its importance. Here the plastisol is converted from a liquid to a solid by the application of heat. The essential requirement is that the plastisol be heated until its entire mass has reached a temperature of about 350° F. No time-temperature requirements can be given as a general rule because of varying heat transfer conditions in different applications. A circulating-air oven at 350° F. will fuse a 20-mil film in 3 to 4 min. while thick sections require a longer time, or a higher temperature.

The term "fusion temperature" has led to much confusion. If two pastes fused at different temperatures develop equal tensile strengths, the one fused at the lower temperature is sometimes said to have the lower "fusion temperature". However, if both are fused at a still higher temperature, and the tensile strengths are again equal, which one has the

Table II.—Primary Plasticizers in Geon 121 Plastisols[a]

Plasticizer	Supplier	Approximate viscosity[b] at 25° C.		Heat stability[c]				Light stability[d]		Tensile strength[e]	Elongation[e]
		½ hr.	2 weeks	5 min.	10 min.	15 min.	20 min.	Initial change	Final breakdown		
		cp.	cp.					hr.	hr.	p.s.i.	%
GP 261	B. F. Goodrich Chemical Corp.	5000	10,000	E	E	E	E	40	150	2300	250
Flexol DOP	Carbide & Carbon Chemicals Corp.	5000	13,000	E	E	E	E	40	150	2200	200
Flexol TOF	Carbide & Carbon Chemicals Corp.	1000	2,000	E	E	E	E	20	60	2000	300
Santicizer 160	Monsanto Chemical Co.	4000	56,000	E	E	W	W	20	150	3000	200
Dioctyl sebacate	Rohm & Haas Co.	1500	4,000	E	E	W	W	40	320	2300	300
Kronisol	Ohio Apex, Inc.	3000	8,000	E	B	B	B	60	150	2300	250

[a] Resin to plasticizer ratio 100:65. Shore Durometer A hardness: 78 — 82 for all samples.
[b] Determined on falling cylinder viscometer.
[c] Heat stability of GP 261 taken as control: B = better; E = equal; W = worse.
[d] Light stability in fading hours in Atlas Fadeometer.
[e] Specimens prepared from 20-mil film fused 5 min. in an oven at 350° F.

lower fusion temperature? Fusion temperature is also used to describe that temperature at which the optimum physical properties are attained. A proposed definition of fusion temperature, as applied to pastes, is as follows: The fusion temperature of a paste is the minimum temperature at which its tensile strength or elongation reaches a maximum. It is believed that this definition is helpful in comparing tensile data per se. Of course, allowance must be made for the physical property which is most important and certainly the conditions of test should be known.

The properties of some simple plastisols are shown in Table I and Figs. 1, 2, and 3.

Plastisol viscosity

Vinyl plastisols, being dispersions in a liquid plasticizer of vinyl resin particles plus other solid ingredients such as fillers or pigments, vary greatly in consistency. Generally, they do not behave like Newtonian liquids in their flow characteristics; that is, their rate of flow is not directly proportional to the shearing force applied. This has its advantages and disadvantages but as a result it may be said that

Table III.—Secondary Plasticizers in Geon 121 Plastisols[a]

Plasticizer	Supplier	Resin to plasticizer ratio 100:65 Flexol DOP to secondary plasticizer ratio 3:1								Tensile strength	Elongation
		Approximate viscosity at 25° C.		Heat stability				Light stability			
		½ hr.	2 weeks	5 min.	10 min.	15 min.	20 min.	Initial change	Final breakdown		
		cp.	cp.					hr.	hr.	p.s.i.	%
P8	Baker Castor Oil Co.	7,000	13,000	E	E	B	B	20	260	2400	300
BN-1	Pan American Chem. Corp.	7,000	13,000	E	E	W	W	20 dark brown	—	2300	250
Plastolene 9250	Emery Industries, Inc.	4,000	9,000	E	B	B	B	40	180	2600	250
Celluflex M179C	Celanese Corp. of America	3,000	14,000	E	E	E	E	20	180	2400	300
Staflex IXA	Deecy Products Co.	3,000	8,000	E	E	E	B	20	200	2400	300
Aroclor 1254	Monsanto Chem. Co.	12,000	27,000	E	E	E	E	40	220	2200	250

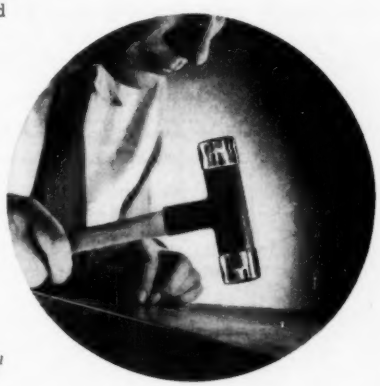
[a] See notes to Table II for information on tests.
[b] Heat stability of sample prepared with Flexol DOP alone taken as control.



tips on tools

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Tenite-tipped hammer manufactured by Tahlen Metal Industries Ltd., Vancouver, B. C., and Seattle, Wash.; tips molded by Plastal Specialties Co., Seattle.

TENITE* *an Eastman Plastic*

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Table IV.—Stabilizers in Geon 121 Plastisols[a]

Stabilizer	Supplier	Heat stability[b] 5 min.	15 min.	30 min.		Light stability[c] Initial change	Final breakdown	Stabilizer form	Appearance of 20-mil film fused 4 min. at 350° F.
						hr.	hr.		
BVS powder	Baker Castor Oil Co.	E	E	E	E	40	100	Solid	Clear
Stabilizer 121	Ferro Chemical Corp.	E	E	E	B	40	150	Liquid	Clear
SN	Advance Solvents and Chemical Corp.	E	E	E	E	20	100	Liquid	Clear
Dyphos (dibasic lead phosphite)	National Lead Co.	E	B	B	B	300	850	Solid	Opaque
Tribasic lead sulfate	National Lead Co.	E	B	E	E	20	200	Solid	Opaque
Basic silicate white lead #201	Eagle-Picher Sales Co.	E	B	E	E	60	150	Solid	Opaque
Vanstay 25	R. T. Vanderbilt Co.	E	E	E	E	400	700	Solid	Clear
Victor 85	Victor Chemical Co.	E	E	W	W	550	1100	Paste	Clear; bubbles

[a]Formulation: 100 parts Geon 121, 65 parts di-2-ethylhexyl phthalate, 3 parts stabilizer.
[b]Heat stability rating of BVS powder taken as control: B = better; E = equal; W = worse.
[c]Light stability in fading hours in the Atlas Fadeometer.

the most important property bearing on the successful deposition of a plastisol by any method is its flow characteristics. The paste compounder should always bear this in mind and should also be aware that every plastisol ingredient has a greater or lesser effect upon paste viscosity.

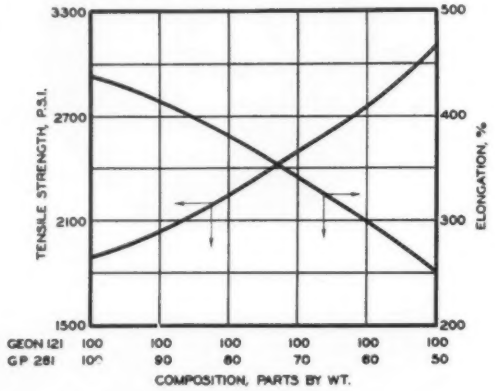
The non-Newtonian flow properties exhibited by plastisols are one of two types or a mixture of both. The first is called thixotropy, or sometimes, false body. Thixotropy has been defined as a partial isothermal gel-sol-gel transition. An everyday example of thixotropy is the consistency of mayonnaise. A paste dispersion is thixotropic if it undergoes a decrease in viscosity upon agitation with a return to its former consistency upon standing. A flow characteristic usually associated with thixotropy in pastes is yield point. This is the shearing force which must be exerted on a dispersion at rest to initiate flow.

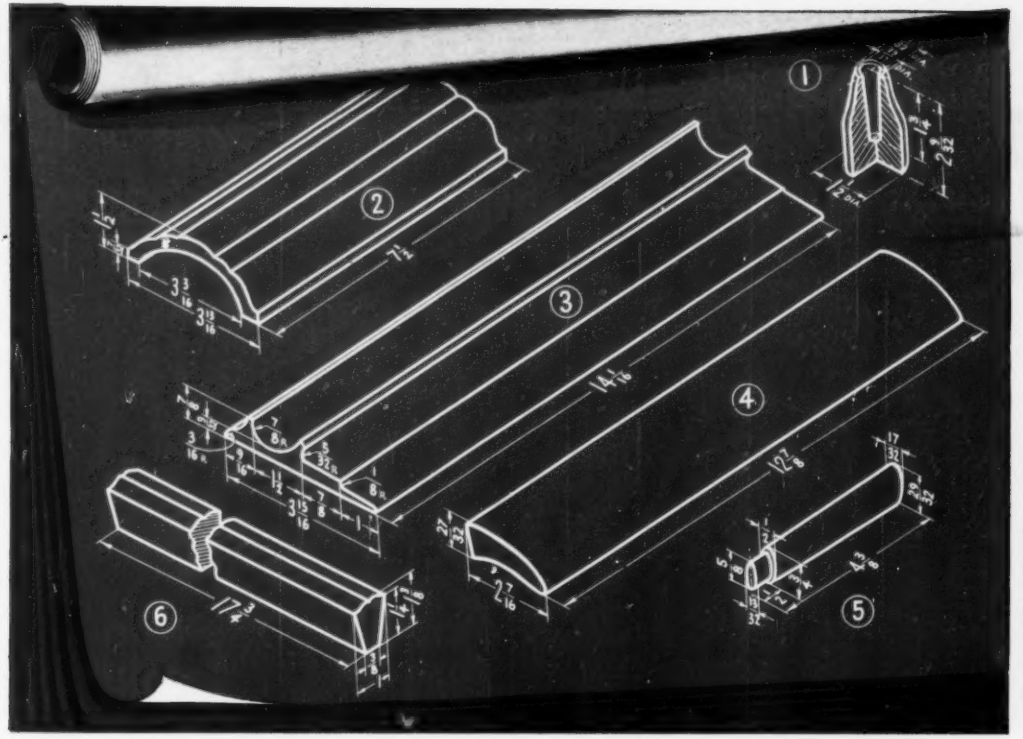
Plastisols may also be dilatant. Dilatant flow is characterized by an increase in apparent viscosity with an increasing rate of shear. This may occur in systems where there is too much loading or where there is high loading of very uniform particle size. While much depends upon the type of equipment used, a plastisol which is quite dilatant is usually not suited for spread coating and one which is highly thixotropic is usually unsuited for molding operations. On the other hand, a slight degree of thixotropy may be beneficial in spreading and a slight degree of dilatancy helpful in dip coating or casting where easy flow is important. Thixotropic and dilatant flow are illustrated schematically in Fig. 4.

Ordinary methods of viscosity measurement are usually unsatisfactory for the compounding of plastisols during the development stage because of their

(*Please turn to page* 160)

1—Tensile strength and elongation of simple plastisols





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Enterprises, great and small throughout America, have found no finer plastic than Marblette cast phenolic resins.

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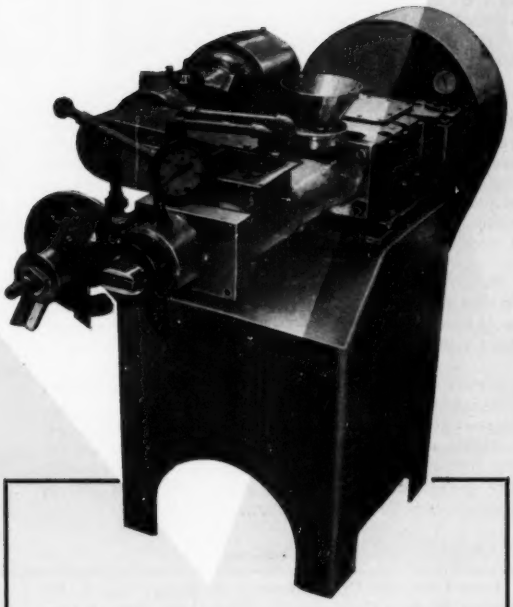
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PLASTICS DIGEST*

Abstracts from the world's literature of interest to those who make or use plastics or plastics products. Send requests for periodicals to the publishers listed

General

RAW MATERIAL REQUIREMENTS OF THE PLASTICS INDUSTRY. G. Thiessen. Chemical Industries *65*, 204-7 (Aug. 1949). The raw material requirements for the synthesis of cellulosic, phenolic, polystyrene, polyethylene, vinyl, alkyd, urea, and melamine resins are described.

PLASTICS DESIGN PROBLEMS. A. E. Javitz. Elec. Manuf. *44*, 108-13, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204 (Sept. 1949). The results of a survey of users and molders of plastic articles definitely establishes the basic responsibility of the product engineer in the design of plastic parts and selection of materials. The supplier, molder, and engineer must work closely together to get a good job done.

NEW VENEER SPLICING TECHNIQUE. D. P. Thomas. British Plastics *21*, 107-9 (Feb. 1949). An edge-bonding technique is used with electronic heat and synthetic resin adhesives in a new veneer production process.

FUTURE OF PLASTIC FILMS. M. R. Gerow. Modern Packaging *22*, 145-8, 189-90 (June 1949). Information on the volume of the types of plastic films, trade names, methods of manufacture, applications, and outstanding properties of the newer materials are presented. The estimated production of plastic films for 1949 is greater than 350 million pounds.

Applications

FOOD USES FOR VINYL-NITRILE. R. Signer and F. W. Tauber. Modern Packaging *22*, 125-7 (Feb. 1949). A new copolymer of vinyl chloride and acrylonitrile is described. This transparent plastic is used in film form for packaging various foods such as oleomargarine, cheese, pickles, and meat. The mechanical properties and permeability to gases and essential oils are reported.

Molding and fabricating

CASTING RESIN AND PLASTER BY AID OF HOT-MELT MOLDS. J. Stewart. Plastics (London) *13*, 352-3 (July 1949). A hot-melt vinyl plastic is described and compared with gelatin, rubber, and plaster used to make molds.

INJECTION MOLDING THERMOSETTING MATERIALS. F. C. Goddard. British Plastics *21*, 170-9 (Apr. 1949). Injection molding and various modifications of this process are discussed briefly. A new injection molding method is described in detail. Test runs of the molding of ash trays with a marked variation in thickness gave molding cycles of 120 sec. floor to floor time for phenolic powders and 135 sec. for urea materials. It was found that preheating is not essential for urea powders. Experiments were made to find out the most suitable type of gate. The superiority of the new injection molding method is most pronounced in the molding of thick sections or articles with strongly varying sections, where the speed of molding can be increased very substantially. At the same time the quality of the products is considerably improved as regards homogeneity. Furthermore, this method shares with transfer molding the advantage of easy flow of material in the mold, with a consequent reduction in mold wear and the possibility of producing articles having weak cores and inserts.

WELDING OF RIGID POLYVINYL CHLORIDE ("VINIDUR"). P. Voigt. Plastics (London) *13*, 307-15 (June 1949). This is a translation of an article by Haim published in a German journal in 1942. Apparatus and techniques for welding rigid polyvinyl chloride plastics are described.

Coatings

HOW TO SPECIFY ORGANIC FINISHES. A. L. Alexander. Product Engineering *20*, 141-5 (July 1949). Problems concerned in specifying organic finishes are discussed. The various types of coatings and resins used in them are considered. Properties and suggested applications for the various types of resins are outlined.

THERMOSETTING ENAMEL FOR GLASS. A Velonis. Modern Packaging *22*, 190-2 (Apr. 1949). A thermosetting coating which has exceptional hardness and adhesion to glass is described.

Testing

SIGNIFICANCE OF THE CHARPY AND FLEXURE TESTS IN EVALUATING THE IMPACT RESISTANCE OF PLASTICS. H. M. Quackenbos, Jr., J. M. Hill, Jr., and C. E. Staff. ASTM Bull. No. 159, 56-65 (July 1949). A Charpy impact test can be made in such a way that the extraneous energies (end-effects and machine losses) are absent and the test result represents only the energy to break the specimen. This test result was determined for notched and unnotched bars of thermoplastics and laminates at various velocities of impact and is compared with the area under a load-deflection curve in flexure. Between 0 and 4 ft./sec. there is a great change in energy to break, but the effect of velocity is slight in the practical impact range (between 4 and 11 ft./sec.). Energy to break involves separation into two such pieces but damage by cracking or deformation may often precede such separation. Such energy for damage can sometimes be best deduced from a flexure test. Possible impact testing methods for all plastics are considered in the light of these findings taken in conjunction with present knowledge of the thermosetting plastics. Two procedures are commended over the present Izod test, and both notched and unnotched bars should be used in each: a) a Charpy test, and b) a Charpy test for some materials and a flexure test for others.

SIMPLIFIED PREPARATION OF FLAT SPECIMENS FOR TENSILE STRENGTH TESTS. V. C. Taxwood. ASTM Bulletin No. 157, 77-8 (March 1949). The use of a sander to machine flat specimens for tensile strength tests.

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U.S. PLASTICS PATENTS

Copies of these patents are available from the U. S. Patent Office, Washington, D. C., at 25¢ each.

POLYSULFONE RESIN. G. E. Eilerman (to Pittsburgh Plate). U. S. 2,474,350, June 28. Copolymer of an olefin and sulfur dioxide plasticized with cresol benzyl sulfonate.

COPOLYMERS. A. L. Barney (to Du Pont). U. S. 2,474,-612-3-4, June 28. Copolymers of vinyl isocoumarins with ethylenically unsaturated compounds, styrenes, and 1,3-dienes.

PROPYLENE POLYMERS. A. B. Hershberger and R. G. Heiligmann (to Atlantic Refining). U. S. 2,474,670-1, June 28. Polymerizing propylene at low temperatures in cycloparaffin solution with Friedel-Crafts catalysts.

COPOLYMERS. P. M. Hauser (to Du Pont). U. S. 2,474,-896-7, July 5. Coating composition containing vinylidene chloride-acrylonitrile dissolved in methyl ethyl ketone and an aromatic or halogenated hydrocarbon as gel retardant.

POLYAMIDES. W. W. Watkins (to Du Pont). U. S. 2,474,923, July 5. Modifying a polyamide containing chalcogen side chains by treatment with an acid.

PHENOLIC RESINS. J. L. Brannon (to Bakelite). U. S. 2,475,005, July 5. Reacting a phenol and formaldehyde in the presence of an onium compound.

VINYLIDENE POLYMERS. W. L. J. de Nie (to Shell). U. S. 2,475,016, July 5. Continuously feeding an emulsion of a vinylidene compound through a series of reaction zones and feeding a quantity of the compound into one of said zones after the first.

POLYAMIDE-ESTER COMPOSITION. E. A. Lasher (to California Flaxseed Products). U. S. 2,475,034, July 5. An interesterification and copolymerization product of adipic acid, diethylene glycol, glycerol, and hexamethylenediamine.

POLYVINYL CHLORIDE. P. O. Tawney (to U. S. Rubber). U. S. 2,475,062, July 5. A vinyl chloride polymer containing combined monoolefinic material and di-allyoxyethyl phthalate.

MODIFIED RUBBER. A. J. Barry, D. E. Hook, and L. DePree (to Dow). U. S. 2,475,122, July 5. Reacting a polyolefinic rubber with a polychloromonohydrosilane at an elevated temperature and under pressure.

INTERPOLYMERS. D. T. Mowry (to Monsanto). U. S. 2,475,150, July 5. Solid copolymers prepared by mixing benzalphthalide and styrene and heating in the presence of a peroxy catalyst.

COPOLYMERS. H. H. Sxmant (to Monsanto). U. S. 2,475,161, July 5. A copolymer of styrene and benzalphthalimide.

MOLDING. A. S. Nyquist and E. L. Kropa (to American Cyanamid). U. S. 2,475,194, July 5. Coating a mold surface of glass with a stannous compound, introducing a thermosetting compound and curing whereby the stannous compound is converted to stannous oxide, and separating the molded object from the mold.

TERPENE RESINS. A. L. Rummelsburg (to Hercules). U. S. 2,475,201, July 5. Reacting a dihydroterpene and a phenol in the presence of an activated siliceous catalyst.

RESINS. A. H. Gleason and B. M. Vanderbilt (to Standard Oil Development). U. S. 2,475,234, July 5. Heating cyclic dimers of butadiene-1,3 or piperylene in the presence of a non-brittle linear hydrocarbon polymer.

BAG. F. O. Budnik. U. S. 2,475,277, July 5. A plastic handbag having fused seams between wall-forming strips and slide fastener tapes.

ALLYL ESTERS. E. C. Shokal and F. A. Bent (to Shell) U. S. 2,475,296-7, July 5. Polymerizing an allyl ester in liquid base in the presence of metallic copper under anhydrous non-oxidizing conditions.

POLYSTYRENE RESINS. F. J. Soday (to United Gas). U. S. 2,475,299, July 5. A plastic composition of polystyrene or derivative thereof plasticized with the lauric acid ester of diethylene glycol monoethyl ether.

POLYMERS. P. Arthur, Jr. and M. S. Raasch (to Du Pont). U. S. 2,475,347, July 5. Polymers prepared by reacting nitropolyhydroxy alcohols and polyamines.

INJECTION MOLDING. N. Lester (to Lester Engineering). U. S. 2,475,395, July 5. A spreader for the cylinder of an injection molding machine.

MODIFIED STYRENE POLYMERS. J. B. Dickey and T. E. Stanin (to Eastman). U. S. 2,475,423, July 5. A polymer of α-difluoromethyl styrene or α-monofluoromethyl styrene.

COPOLYMERS. J. B. Dickey and T. E. Stanin (to Eastman). U. S. 2,475,424, July 5. Copolymer obtained by heating N-methyl-N-phenylsulfonyl-vinyl amine and vinyl acetate in the presence of a catalyst.

POLYETHYLENE. M. J. Roedel (to Du Pont). U. S. 2,475,520, July 5. Polymerizing ethylene under heat and pressure of Grignard-type catalysts.

COPOLYMERS. D. Swern and G. B. Dickel (to U. S.). 2,475,557, July 5. Polymers obtained by copolymerizing vinyl acetate with an ester of 9,10-dihydroxy stearic acid and an olefinic alcohol containing a terminal methylene group.

PHENOLIC RESINS. H. L. Bender and A. G. Farnham (to Bakelite). U. S. 2,475,587, July 12. Fusible novolak resins prepared from formaldehyde and a phenol by refluxing at pH 4 to 7 in the presence of a metal oxide to form a mixture of diphenylol methanes, heating to form resinous intermediates which will react with a hardening agent.

ARTIFICIAL TEETH. R. W. Erdle (to Austenal Laboratories). U. S. 2,475,599, July 12. Method of making artificial resin teeth.

POLYMERS. W. F. Gresham and C. D. Bell (to Du Pont). U. S. 2,475,610, July 12. Polymers of 1,3,5-trioxepane. (*Please turn to page* 122)



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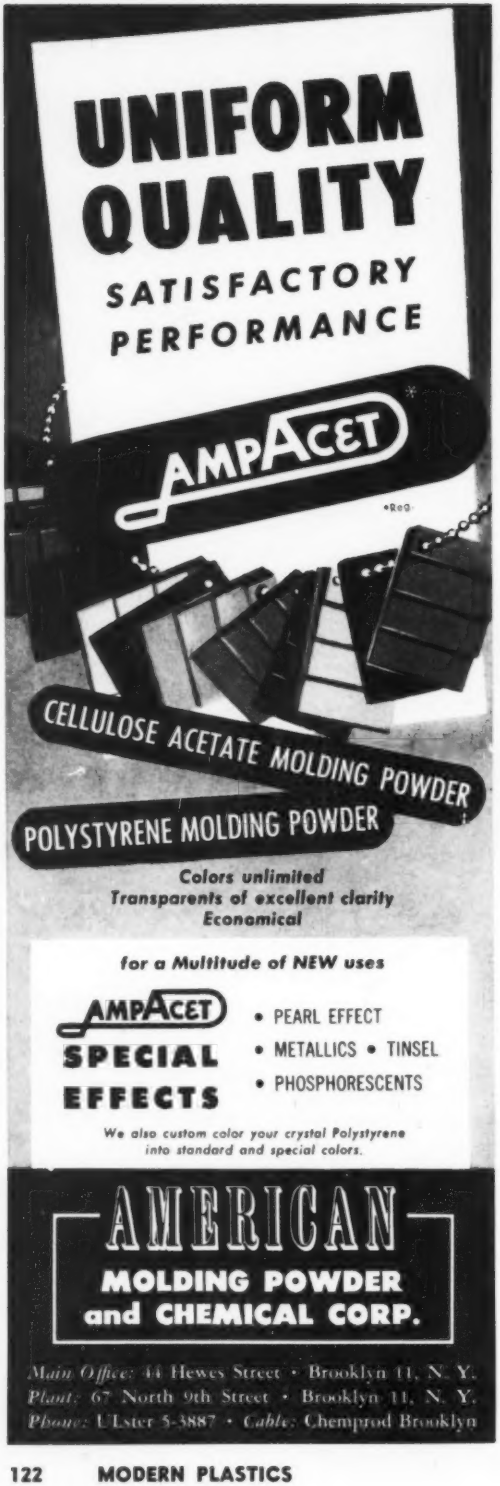
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COATING. M. Leatherman. U. S. 2,475,626, July 12. Treating fabric with vinyl chloride-acetate copolymer, *n*-butyl methacrylate polymer, tricresyl phosphate, triphenyl phosphate, zinc oxide, acetone, aromatic hydrocarbon solvent, pigment, and pentachlorophenol.

POLYETHYLENE. E. E. McSweeney (to Standard Oil). U. S. 2,475,628, July 12. Continuous process for polymerizing ethylene.

POLYETHYLENE. J. E. Seehold (to Standard Oil). U. S. 2,475,643, July 12. Continuously polymerizing ethylene in the presence of a peroxy compound.

POLYETHYLENE. G. G. Stoner and R. L. Savage (to Standard Oil). U. S. 2,475,648, July 12. Polymerization of ethylene in the presence of a di-peroxydicarbonate ester catalyst.

INORGANIC PLASTIC. K. Turk. U. S. 2,475,651, July 12. A machinable thermoplastic prepared by forming a mixture of a liquid plasticizer, a metal borosilicate, magnesium oxide and an alkaline metal sulfate, and heat treating.

COPOLYMERS. H. L. Gerhart (to Pittsburgh Plate). U. S. 2,475,664, July 12. The molded, hard vulcanizate of sulfur and a copolymer of a glyceride drying oil and a diene hydrocarbon.

CELLULOSE ESTERS. R. D. Rowley (to Celanese). U. S. 2,475,678, July 12. Dissolving hydrolyzed cellulose acetate in glacial acetic acid, adding acetic anhydride, and heating until cellulose triacetate is produced.

BITUMEN TREATMENT. J. C. Derksen (to Hartford National Bank and Trust). U. S. 2,475,699, July 12. Asphalt blended with polyethylene to reduce brittleness.

COPOLYMERS. G. S. Weith (to Bakelite). U. S. 2,475,731, July 12. Copolymers of styrene with an ester of a glycol and a mixture of maleic anhydride and cyclopentadiene maleic adduct.

MOLDING COMPOSITION. H. A. Osserman (to Dictograph Products, Inc.). U. S. 2,475,802, July 12. Mixture of methyl methacrylate polymer, ethyl cellulose, and as much acetone as the mixture will absorb to render it plastic.

SULFONATED RESIN. M. T. Goebel (to Du Pont). U. S. 2,475,886, July 12. Sulfonated copolymer of styrene and maleic anhydride.

CELLULOSE ESTERS. W. M. Gearhart and T. S. Gardner (to Eastman). U. S. 2,475,953, July 12. A stable cellulose ester, a saturated plasticizer, and an unsaturated aliphatic compound.

HYDROCARBON POLYMERS. W. J. Sparks and R. M. Thomas (to Standard Oil Development). U. S. 2,476,000, July 12. Solid hydrocarbon polymer prepared at —10 to —30° C. by the use of a Friedel-Crafts catalyst.

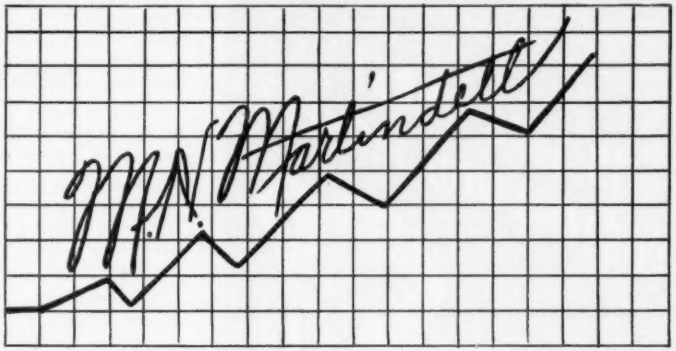
COPOLYMERS. A. M. Clifford (to Wingfoot). U. S. 2,476,027, July 12. An aqueous emulsion of butadiene-1,3 and tetrahydrofurfuryl methacrylate.

POLYMERIZATION. B. L. Ritz and H. L. Johnson (to Sun Oil). U. S. 2,476,064, July 12. Copolymer of a mixture of an iso-olefin, a 1,3-diolefin, a vinyl substituted aryl compound, and a mono-olefin prepared at subzero temperature in the presence of a Friedel-Crafts catalyst.

MODIFIED UREA RESINS. J. D. Robinson (to Wingfoot). U. S. 2,476,065, July 12. A resinous condensate of urea, formaldehyde, and acrylonitrile. (*Turn to page* 124)

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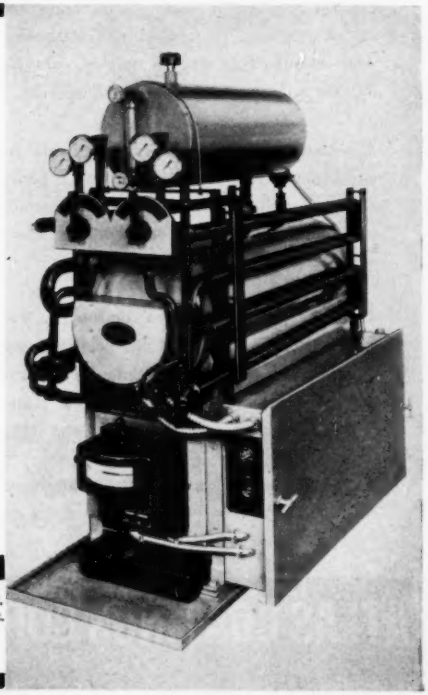
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MODIFIED MELAMINE RESIN. H. J. West (to American Cyanamid). U. S. 2,476,127, July 12. Reacting tetramethylol melamine with aniline at 80° C. to form a softened mass, raising the temperature to effect solution, and cooling to obtain a solid mass.

ORGANOSILOXANE POLYMERS. E. C. Britton and H. C. White, (to Dow). U. S. 2,476,132, July 12. Heating a mixture of hydrobromic acid and an organosiloxane.

TUBING. K. G. Francis (to Dow). U. S. 2,476,140, July 12. Forming a supercooled tube of vinylidene chloride polymer, conveying between pinch rolls and inflating to stretch and crystallize, and maintaining in the interior finely powdered vinylidene chloride polymer.

ELASTOMER. R. V. White and H. L. Coonradt (to Socony-Vacuum Oil). U. S. 2,476,168, July 12. Reacting an alkaline polysulfide with chlorinated paraffin wax.

MOLDING. M. A. Bauman (to Lees-Bradner). U. S. 2,476,272, July 19. An injection molding machine.

EMULSION. D. X. Klein (to Du Pont). U. S. 2,476,308, July 19. A stable emulsion comprising water, a water-immiscible organic liquid and an emulsifying agent, said emulsifying agent comprising a polymer of an alkyl siliconic acid.

CELLULOSE DERIVATIVE. R. W. Swinehart, A. B. Savage, and W. D. Kuhlman (to Dow). U. S. 2,476,331, July 19. Immersing cellulose in aqueous carboxylating agent, immersing in sodium hydroxide, and methylating with methyl chloride under heat and pressure.

COPOLYMERS. K. H. Weber (to Armstrong Cork). U. S. 2,476,341, July 19. A rubbery composition comprising the copolymer of an allyl ester of a monocarboxylic acid with a conjugated diene and a styrene or acrylonitrile.

MOLDING COMPOSITIONS. J. Allan (to Celanese). U. S. 2,476,347, July 19. Impregnating regenerated cellulose fibers with a solution of synthetic resin in volatile solvent, evaporating the solvent, and grinding whereby a molding composition is obtained.

MOLDING. R. Williams. U. S. 2,476,395, July 19. A centrifugal molding machine.

VINYL RESINS. R. I. Leininger (to Monsanto). U. S. 2,476,422, July 19. Polyvinyl chloride stabilized with 2-phenyl indole and dibutyl diphenyl tin.

TUBE. L. Lindell. U. S. 2,476,446, July 19. A collapsible dispensing tube of transparent plastic material.

POLYMERIZATION. M. Baer (to Monsanto). U. S. 2,476,474, July 19. Polymerizing an aqueous dispersion of vinyl halide in aqueous solution containing a heteropolymer of vinyl acetate and maleic acid.

COPOLYMER. C. E. Barnes and W. O. Ney, Jr. (to General Aniline). U. S. 2,476,527, July 19. A thermal-reversible gel comprising the interpolymer of an acrylic acid with an acrylic amide and gelatin.

MOLDED ARTICLES. D. F. Fraser (to Monroe Auto Equipment). U. S. 2,476,540, July 19. Placing molded articles in cold liquid whereby flash is embrittled and tumbling to remove flash.

MOLDING. C. Jobst (to Owens-Illinois Glass). U. S. 2,476,550, July 19. An injector for molding machines.

MOLDING. S. K. Moxness (to Minneapolis-Honeywell). U. S. 2,476,558, July 19. Apparatus for molding plastics.

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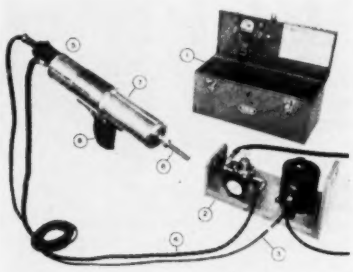
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NEW MACHINERY AND EQUIPMENT

Contour machine—DoALL Co., Des Plaines, Ill., announces the Contour-matic, a machine which automatically performs many of the basic cutting operations manually performed on the company's earlier contour machine. In using a Contour-matic, no auxiliary table or clamp is required—just jigs and fixtures. The table moves hydraulically and the jigs and fixtures are secured by hexagonal head bolts slipped into any of four T-slots which run the length of the table. Since the feed mechanism is part of the table, production work can be locked in the table, the machine started, and the cut made without further operator attention. It is claimed that one man can handle a dozen or more machines making heavy cuts. Hydraulic power is used for the feed mechanism and for tilting the work table from 45° to the right to 10° to the left, a feature that permits compound bevel cutting. The saw guide post is also hydraulically adjustable.



The machine is complete with a flash welder for making saw blades out of bulk stock or repairing those broken or cut for internal sawing. It also has fittings to accommodate file bands, abrasive belts, and polishing cloths.

Specifications include: 78¾ in. high; throat, 20¼-in. full clearance; sawing capacity, 0 to 12 in. maximum; filing capacity, up to 12 in. with up to 6-in. filing surface; table movement, 16-in. stroke, hydraulic actuated, over ground and polished slide rods; hydraulic variable feeding pressure and variable feed speed; wheel adjustments, hydraulic for tension, 3-in. range, handwheel conveniently located for tilt; length of saws, 164 in.; length of files, 162 in.; width of saws, 1 1/16 to 1 in.; width of files, ½, ⅜ and ¼ in.; saw tension, hydraulic adjustment for blade width used; hydraulic speed regulator; cutting speed of from 40 to 10,000 ft. per min.; three-range tachometer type speed indicator giving exact f.p.m. reading; three-phase, 7½ hp., 220 volts, 50/60-cycle, 1750 r.p.m. standard motor.

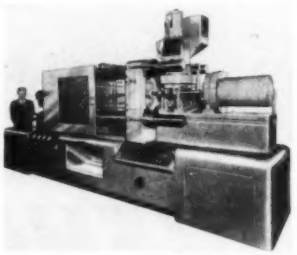
Hydraulic safety valve—R. D. Wood Co., Public Ledger Bldg., Philadelphia, Pa., announces a high pressure hydraulic throttle-type valve called Protectomatic, designed to operate from 1500 to 5000 p.s.i. working pressure. It controls the falling speed of weighted-type accumulators, and acts as a protective device in preventing an accumulator tank or platform from crashing on its bumper blocks. The valve is machined from solid forged steel blocks, with bronze bushings and stainless steel sliding plunger, seat, and spindle.

Dryer—A turbo dryer with screw conveyor for the drying of cellulose acetate is announced by Wyssmont Co., 31-04 Northern Blvd., Long Island City 1, N. Y. The dryer is installed right above the extruder. By means of the totally inclosed screw conveyor, the dry and heated granules are discharged at a uniform rate directly into the hopper of the extruder. There is said to be no disintegration of the granules.

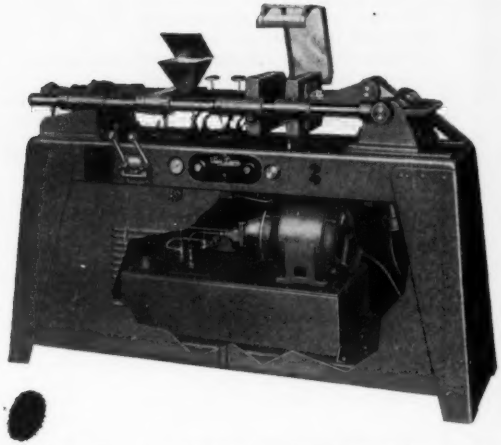
Vibrator—A Type UH pneumatic vibrator which can be easily attached to or removed from units that require vibration, such as mold boxes, hoppers, bins, fatigue testing, screens, concrete forms, etc., is offered by the Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, Ohio. It is obtainable in a 2-in. piston diameter size and operates efficiently on 50 to 100 p.s.i. continuous line pressure. The number of vibrations per min. and the intensity of vibration can be controlled by regulating the air pressure. At 80 p.s.i. line pressure, the unit develops about 1200 blows per min. consuming approximately 10 c.f.m. for continuous operation.

Granulating machine—Two sizes of granulating machines, Model #40 and Model #½, are announced by Cumberland Engineering Co., Inc., Box 126, Providence, R. I. The units were designed specifically for installation beside injection molding machines—one granulating machine to each molding machine. This practice permits the operator of the molding machine to trim parts and feed the sprues and runners into the granulating machine. Handling of material to and from central grinding stations and danger of mixing colors are thus avoided. The units are built along the same lines as other Cumberland machines. They feature the same compact cutting chambers and ease of cleaning, and provide compact "intensive cutting." They have smaller motors in their bases, V-belt drives and built-in, dust-tight material containers. The smaller machine, Model #0, occupies a floor space 27¼ by 20½ in.; the larger machine, Model #½, a floor space 30½ by 23⅜ inches.

Injection molding machines—Crown Machine and Tool Co., Inc., 2800 W. Lancaster Blvd., Fort Worth 7, Texas, has added a 32 and a 56-oz. molding machine (shown below) to its line of Crown Moldmasters. By using a new hydraulic principle in the hydro-pressure and mold clamping mechanisms, pressures up to 750 tons are provided, yet the machines are small compared to the heavy structures heretofore thought necessary to develop such pressures. This arrangement permits fast operating cycles and molding of large objects. A small, long-stroke cylinder positions the platens. Rotating a thrust plate transfers the thrust to a rigid frame which enables the use of a large cylinder with a short travel for the final closing of the mold under high pressures.

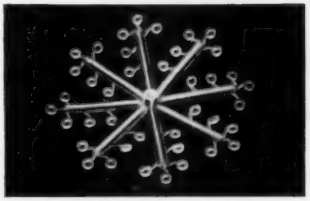


Both machines are equipped with a pre-plasticizing chamber, in which material is plasticized before it reaches the injection cylinder. This permits the injection plunger to operate in a fluid material, reducing friction to a minimum and making possible lower in-

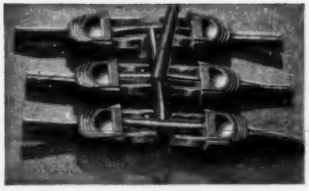


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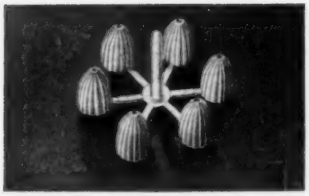
These items are typical of *hundreds* being produced *at lowest possible price* on Van Dorn plastic presses. For these 1 oz. injection presses mold practically all thermoplastics including nylon. Moderately priced, they use inexpensive molds and operate 8 hours for under one dollar. *No wonder these versatile presses quickly repay their cost!*



Polyethylene
¼ ounce
5¼" dia.



Vinyl Chloride
1 ounce
5½" x 3¼"



Polystyrene
4/5 ounce
4" dia.

Extra Savings with NEW GRINDER!

This Van Dorn machine cuts operating costs even more, because it grinds up rejects, sprues, etc., for re-use. Its features include sturdy, all-steel construction, an efficient cutting chamber, and ease of cleaning.

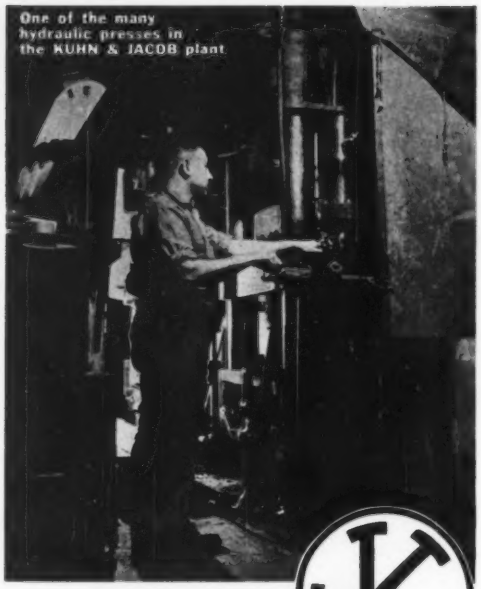


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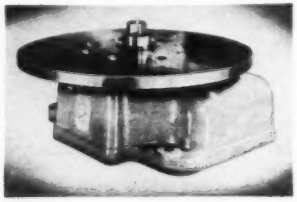
Wm. A. Chalverus, 2606 N. Fifth St.
Philadelphia, Penna.
Telephone — GArfield 3-3322

jection pressures. The vertical plunger operates automatically, replacing granular plastic in the chamber whenever any material is withdrawn to the injection cylinder. A large volume of plasticized material under pressure is available at all times.

Specifications of 32 and 56-oz. Injection Molding Machines

	32-oz.	56-oz.
Capacity:		
Cu. in. molded per shot (polystyrene)	60	93
Oz. molded per shot (polystyrene)	36.5	60
Lb. of plasticized material per hr. (polystyrene)	130	130
Diameter of injection plunger, in.	2.59	3.25
Max. pressure on material per sq. in.	16,400	10,438
Stroke of injection plunger, in.	11.5	11.5
Rate of injection, cu. in. per sec.	12.7	20
Size of die plate, in.	22	22
Clearance between bars, in.	27	27
Mold opens variable: Maximum, in.	24	21
Minimum, in.	10	10
Maximum die space, in.	30	30
Maximum area cast, sq. in.	350	350
Mold closing pressure, tons	768	768
Power consumption of heating unit, when plasticizing to full capacity per hr., kw.	7.50	7.50
Motor, hp.	50	50
Dimensions: Length, in.	192	192
Width, in.	48	48
Height, in.	102	102

Indexing fixture—Ettco Tool Co., Inc., 594 Johnson Ave., Brooklyn 6, N. Y., is offering the Ettco-Emrick No. 97 electric indexing fixture for accurate and rapid indexing of work pieces. It can be used for punch press, tapping machine, drill press, and similar operations. A modified geneva system electrically controls table indexing motion to assure smooth, shockless action. At each of the eight indexing stations, the table is locked in place by a hardened pin. Machine and index fixture motions are automatically synchronized by a built-in electric control. The unit is available with interchangeable indexing plates ranging in size from 10 to 14 in. in diameter.



Push-on fastener—According to Tinnerman Products, Inc., 2035 Fulton Rd., Cleveland, Ohio, savings up to 50% in the assembly of plastic knobs are possible through a new application of its push-on type Speed Nuts. This method of use, applicable in most assemblies requiring the attachment of a plastic knob to a round shaft, was developed by the Lovell Manufacturing Co., Tinnerman Products, Inc., and Perry Plastics Co., for washing machine wringer knobs.

The knob is molded in two parts. The cap of the knob contains a cylindrical cavity into which the round, push-on Speed Nut is inserted. The two knob sections are then cemented together, holding the fastener securely in position. The completed knob is then pushed onto the shaft in the final assembly and held securely in place by the Speed Nut.

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BOOKS AND BOOKLETS

Write for these publications to the companies listed. Unless otherwise specified, they will be sent gratis to executives who request them on business stationery

"The Petroleum Chemicals Industry," by Richard F. Goldstein.

Published by E. & F. N. Spon Ltd., 57, Haymarket, London, S. W. 1, England. Price 3£ 3s. 449 pages.

In view of the present plans for the expansion of the oil refining capacity of the United Kingdom, this authoritative book will hold special interest for all those interested in petroleum and its products, in catalysis and catalytic processes, in industrial solvents, and in all branches of the organic chemical industry. Both principle and practice are dealt with. The comprehensive subject matter ranges from fundamental chemical theory to the application and outlet for the finished product.

"Elastomers and Plastomers. Their Chemistry, Physics, and Technology." Vol. II. Manufacture, Properties, and Applications, Edited by R. Houwink

Published by Elsevier Publishing Co., Inc., 215 Fourth Ave., New York 3, N. Y. 1949. Price $9.00. 515 pages.

This volume is part of the Polymer Series in production by this publisher. It contains outstanding chapters on phenolic, amino, ethylene, cellulose, protein, butadiene, and natural resin polymers. Less comprehensive chapters are devoted to polyamides, silicones, alkyd resins, natural rubber, asphalt, and ion exchange resins. The excellence of physical composition and style established in the earlier volumes is maintained in this new contribution. *G. M. K.*

Roll slitters & unwinders for every industrial use (Bulletin No. 549)—Described and illustrated in this four-page bulletin are the company's roll slitters and unwinders. One page of the bulletin is devoted to construction details for all types of the company's slitter units. *Johnstone Engineering and Machine Co., Parkesburg, Pa.*

Technical developments in packaging (Packaging Series No. 29)—Presented in this 31-page booklet are three papers that were given at the Packaging Conference and Exposition of the American Management Association held at Atlantic City this past Spring. The papers are: Plastic Bonding Techniques, Insect-Free Packaging, and Packaging Uses of Polyethylene. The booklet is available to non-members of the association for 50¢. *American Management Association, 330 W. 42nd St., New York 18, N. Y.*

Silvacon in industrial products and processes (Bulletin 10)—The application of fractionated bark products in a wide range of industrial uses is described in this four-page bulletin. Listings of the principal uses and advantages of various fractions are given, as is also a tabulation of the physical and chemical properties of the company's cork, fibers, and powders. *Silvacon Sales, Weyerhaeuser Timber Co., Longview, Wash.*

Hercules synthetic resins—Included in this revised booklet on the company's synthetic resins is a chart which matches the resins with their actual and potential uses. The formulator who is faced with a resin problem can select from this chart the resins indicated for use in a particular field. Then, by turning to the pages where the resins are described, he can study the properties of the desirable resins and select the one which will best suit his purpose. The resins described are used in the manufacture of protective coatings, adhesives, printing inks, linoleum and floor tile, asphalt compositions, essential oils and fixatives, sizings for paper and textiles, and binders for flameproof compositions. *Hercules Powder Co., Inc., Wilmington, Del.*

Stokes microvac pumps for high vacuum—Described in this 36-page booklet is the complete line of the company's Microvac pumps, including specifications. Vacuum data and engineering information are given, together with actual vacuum processing problems for many industries. The three-color booklet is amply supplemented with charts, graphs, and tables for ready reference. *F. J. Stokes Machine Co., 5900 Tabor Rd., Philadelphia 20, Pa.*

Aromatic industrial solvents—This 49-page booklet deals primarily with aromatic distillates as solvents. It presents product specifications, properties and methods of testing, the power of solvents, and a short treatise on the safe use of solvents. *The Barrett Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.*

Plasticized polyvinyl chloride formulations—Presented in this 10-page booklet are 22 plasticized polyvinyl chloride formulations, based on laboratory and field work. The formulations are representative of types used in manufacturing a wide range of articles, from shower curtains and raincoats to upholstery material and floor tile. The outstanding properties of each formulation are given. Included is a comprehensive list of suppliers of polyvinyl chloride resin, plasticizers, and stabilizers. *Organic Chemicals Div., Monsanto Chemical Co., St. Louis, Mo.*

Fluorescent fixtures—The company's complete line of fluorescent fixtures is set forth in this 74-page catalog, divided into three main sections—industrial, commercial-residential, and troffers. Each section is a complete catalog in itself that can be detached as a separate unit. A supplementary section provides a practical guide on how to plan a fluorescent lighting installation. Also included is a chart showing the amount of illumination required for approximately 80 typical lighting applications. *Sylvania Electric Products, Inc., 500 Fifth Ave., New York 18, N. Y.*

Money isn't everything—The operation of a merchandise prize incentive campaign is the subject of this 24-page booklet. Contents include such topics as how to get the most from a salesman in today's competitive market, the extra ingredient that makes a salesman work harder, how to capitalize on the family influence in order to get a man to sell more goods, and the type

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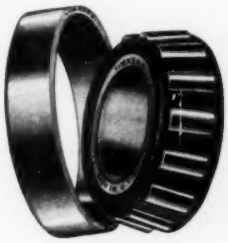
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RUN-OUT	.000075"	.000150"	.000300"
TYPES AVAILABLE	Standard Single Row	Standard Single Row	All types
SIZE RANGE	Up to 10" O.D.	Up to 12" O.D.	Up to 12" O.D.

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of sales campaign considered a sure thing by many sales executives. *Mr. R. S. Bare, Cappel, MacDonald & Co., Cappel Bldg., Dayton 1, Ohio.*

Severance faster finishing midget mills (Catalog No. 17)—The company's complete line of midget mills is described, illustrated, and specified. Among the tools presented in the booklet are inside deburring cutters, outside chamfering mills, tube deburring cutters, chatterless countersinks, ball nose drills, and edging mills. *Severance Tool Industries, Inc., Saginaw, Mich.*

Triethyl phosphate—The specifications, properties, and uses of triethyl phosphate are described in this four-page bulletin. Included is a bibliography of technical literature containing numerous references to the uses of the chemical. *Tennessee Eastman Corp., Kingsport, Tenn.*

Lima electric motors, pedestal grinders, polishing, buffing lathes (Bulletin DB-1)—Described in detail are the company's gearshift drives for machine operation, motors and pedestal grinders, and buffing and polishing lathes. Type and gear ratio information is also presented. Several machine tool drive application pictures and a cutaway view of the internal working parts of the drive are shown. *Mr. L. C. Wiss, sales manager, The Lima Electric Motor Co., Lima, Ohio.*

Spraylat protective coatings—The advantages of the company's temporary protective coatings for protection of painted surfaces are set forth in this bulletin. *Spraylat Corp., One Park Ave., New York 16, N. Y.*

Bauer process equipment—Illustrated and described is the company's complete line of process equipment which includes pulp refiners and paper stock classifiers; attrition and hammer mills; magnetic separators; and nut blanchers, roasters, and granulators. One section of the booklet is devoted to the fiber products laboratory and food and milling laboratory where pilot runs are made for a variety of industries. *Bauer Bros. Co., 1773 Sheridan Ave., Springfield, Ohio.*

Testing and research in modern industry—Contained in this 113-page booklet is a description of the activities of the organization in various fields. Included are tables on weights and measures, numbering systems, tensile strength of metals, hardness, etc. *United States Testing Co., 1415 Park Ave., Hoboken, N. J.*

Cabot carbon blacks in polyethylene—The findings of an investigation conducted by the company on the pigmentation of polyethylene with carbon blacks are reported in this bulletin. The investigation was directed toward determining: 1) the type of carbon black which would produce the jettest black polyethylene film; 2) the percentage loading of pigment necessary for maximum jetness and the effect of various loadings; and 3) the best dispersion technique for polyethylene-carbon black dispersions. *Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10, Mass.*

Felsenthal plastics—Contained in this 23-page booklet is a description of the services that the company offers the plastics industry. Illustrated and described are many of the products that the company has molded or fabricated. Included is a glossary of the plastic raw materials used by the company. *G. Felsenthal & Sons, 4100 W. Grand Ave., Chicago 51, Ill.*

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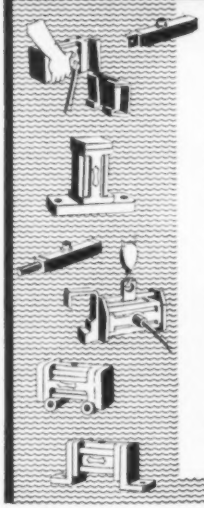
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Production of

FOR THE purpose of this report, production is the sum of the quantities of materials produced for consumption in the producing plant, for transfer to other plants of the same company, and for sale. Sales include only the quantities involved in bona fide sales in which title passes to the purchaser.

The figures of sale given in the present report are not comparable with those for consumption in

PLASTICS AND SYNTHETIC RESIN PRODUCTION From Statistics Compiled by

Materials	*Total prod'n first 7 mos. 1949*
CELLULOSE PLASTICS:[a]	
Cellulose acetate and mixed ester plastics:	
Sheets, continuous:	
Under 0.003 gage	3,782,243
0.003 gage and over	4,265,675
All other sheets, rods, and tubes	2,414,589
Molding and extrusion materials	28,739,791
Nitrocellulose:	
Sheets	3,862,015
Rods and tubes	869,407
Other cellulose plastics[b]	5,023,411
PHENOLIC AND OTHER TAR ACID RESINS:	
Laminating	22,336,764
Adhesives	13,935,778
Molding materials[a]	62,188,838
Protective coatings (containing less than 10% modifier)	8,918,431
Miscellaneous uses, including casting	23,019,538
UREA AND MELAMINE RESINS:	
Adhesives	20,365,222
Textile- and paper-treating resins	13,926,204
Protective coatings, modified and unmodified	8,429,540
Miscellaneous uses, including laminating and molding[c]	27,217,770
STYRENE AND STYRENE DERIVATIVE POLYMER AND COPOLYMER RESINS:	
Molding materials[a]	95,460,135
Miscellaneous uses[d]	14,360,509
VINYL RESINS:	
Sheeting and film, including safety-glass sheeting[a]	76,786,366
Adhesive (resin content)	5,564,781
Textile- and paper-treating resins, including spreader and calendering types (resin content)	15,990,265
Molding materials (resin content)	38,807,973
Miscellaneous uses (resin content)[d]	10,111,566
MISCELLANEOUS SYNTHETIC PLASTICS AND RESIN MATERIALS:	
Molding materials[a, e]	24,565,336
Protective coatings[f]	25,632,925
All other uses[g]	85,132,276

[a] Includes fillers, plasticizers, and extenders. [b] Includes sheets, rods and tubes, and molding and extrusion materials. [c] Data on resins for laminating and miscellaneous uses are on a dry basis; data on molding materials are on the basis of total weight. [d] Excludes data for protective coatings. These data are included with miscellaneous coatings to avoid disclosure of the operations of individual companies. [e] Includes data for acrylic, aniline-for-

Plastics Materials

the producing plants plus shipments to other plants given in earlier reports. The figures for production given in the present report, however, would be comparable with figures for consumption in producing plants plus shipments given in earlier reports except for inventory changes. From month to month these changes in inventory may be substantial, but over several months they tend to even out.

IN POUNDS FOR JUNE AND JULY, 1949
U. S. Tariff Commission

June 1949		*July 1949*	
Production	*Sales*	*Production*	*Sales*
420,047	389,308	494,893	478,839
543,719	541,573	584,063	528,384
278,546	292,142	253,190	237,644
4,303,366	3,924,825	3,430,606	3,544,460
525,180	385,693	290,992	321,599
100,572	136,839	81,123	103,935
175,985	448,782	433,489	423,773
2,625,554	1,508,248	2,316,468	1,464,451
2,189,303	1,655,300	2,045,407	1,899,222
6,786,662	7,442,141	4,334,752	5,549,846
1,224,523[b]	959,486[b]	994,434	874,768
3,350,694	3,786,955	2,535,841	2,900,691
2,577,280	2,802,296	2,593,280	2,625,372
1,799,430	1,686,477	1,742,486	1,421,663
1,340,951	1,077,971	717,814	1,030,438
3,554,580[b]	2,574,964[b]	1,936,969	2,020,659
12,957,354	12,966,426	13,311,628	11,262,566
2,071,875	1,614,929	2,593,215	1,928,343
10,827,542	10,273,692	10,019,967	10,890,671
902,895	826,657	378,431	729,954
2,177,378	2,128,732	1,900,865	2,181,975
5,592,298	5,258,404	5,560,330	5,516,126
1,136,063	685,579	993,865	653,382
4,021,285	3,459,597	3,395,388	2,239,141
3,738,985	3,937,626	3,670,684	3,751,449
10,803,705	10,817,429	11,474,040	11,023,541

maldehyde polyethylene, nylon and other molding materials. [f] Includes data for coumarone-indene, petroleum polymer and condensation, silicone, and other protective coating resins. [g] Includes data for acrylic, alkyd, coumarone-indene, nylon, petroleum polymer and condensation, silicone and other plastics and resins for miscellaneous uses. [b] The totals given here have been revised from first reports.



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CONVEYORS





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The timer or cut-off may be purchased separately if desired. Has ½ H.P. motor — weighs 325 lbs. — Timer weight, 50 lbs.

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New British I. C. I. Plant

THE new Wilton, England, works of Imperial Chemical Industries Ltd., covering 2000 acres and built at a cost of £22,000,000, were officially opened on September 14. The opening marked the completion of the first stage of what the company describes as "the most ambitious project ever undertaken by the British chemical industry."

To date, only two plants at Wilton are in actual operation. One of them is producing Perspex acrylic sheet; the other is manufacturing phenol formaldehyde molding powder.

To produce ethylene and propylene

The project at Wilton (which is on the northeast coast of England) is based on two major activities: the cracking of petroleum for the production of basic organic chemicals, and the electrolysis of brine for the production of chlorine and caustic soda. Two important products of the oil cracker, which is being erected by the Kellogg Co., will be ethylene and propylene. The former will be used for making polyethylene, which is now produced from alcohol. Another end product which will be made from ethylene via ethylene glycol will be Terylene, a new synthetic fiber. Propylene will be converted into acetone via isopropanol and used in the manufacture of acrylic resin.

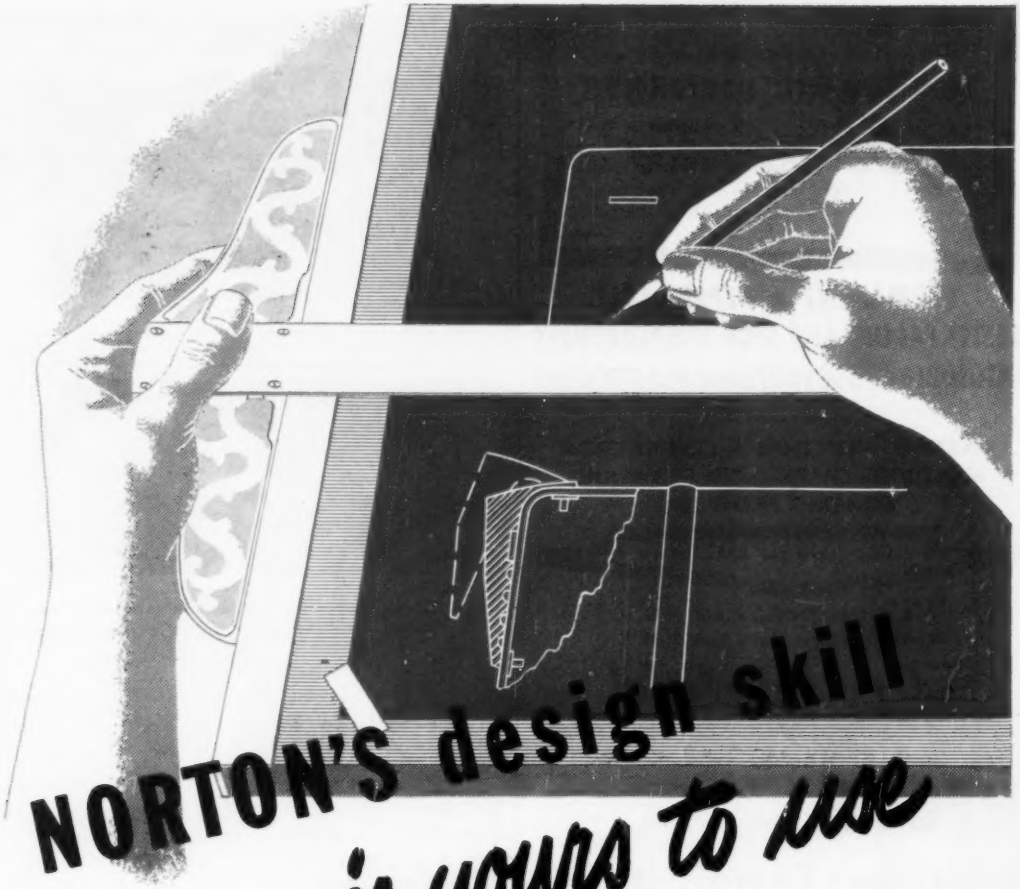
World's largest sheet acrylic plant

The Perspex plant is said to be the largest sheet acrylic plant in the world, and incorporates the latest developments in mechanical and automatic control. The installation includes a semi-continuous polymerization tunnel oven. The filled glass molds or cells are mechanically loaded onto trucks, which then pass to an automatically operated tunnel oven similar in principle to the type used in the pottery industry to pass ceramic ware through controlled zones of heat.

The Wilton acrylic plant is the third I.C.I. factory in Great Britain presently producing this material. The other two are at Darwen in Lancashire and at Billingham. The augmented output of acrylic sheet is expected to increase the export trade which now amounts to £750,000 a year for acrylic sheet alone.

The large phenol formaldehyde plant at Wilton will replace the small outdated I.C.I. factory at Croydon, outside of London. One of the outstanding features of this plant is the installation of the latest dust handling equipment which will completely eliminate all risk of dust explosions. The output of this plant will make I.C.I. one of the largest manufacturers of phenolic powders in Great Britain. It is expected that a plant for making urea formaldehyde powder at Wilton will be built within two or three years.

—John S. Trevor



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At top, pump end of light-weight irrigation hose. Each section, bottom, has discharge tubes at 18-in. intervals

Glass-Fiber Hose

THE labor and expense involved in digging irrigation ditches and keeping them open has always been a constant headache to the harried farmer. Now, however, with a flexible plastic hose that is designed to carry water to the crops from well or pond, the farmer's irrigation worries are practically over.

Not only does the hose, which is made of cloth woven of Fiberglas yarns and coated with Vinylite resins, save the 4 to 6 ft. of soil usually lost through ditch digging operations, but it saves 20 to 25% of the water lost as well.

The main line of the plastic hose, which is a product of the Holton Corp., New Orleans, La., is 100 ft. long, 9¾ in. in diameter, and weighs only 45 pounds. Thus, transportation of the hose in the fields is comparatively easy. Each 100-ft. section of main line hose is equipped with a tee to which is joined a 64-ft. outlet section. The outlet sections have discharge teats spaced every 18 in., through which the water is sent into the rows to be irrigated.

The plastic hose does not need to be dried after use and special storage care is not required. It is reported that the hose will not rot, will not support combustion, and exposure to the elements causes no deterioration.

Plastics where plastics belong

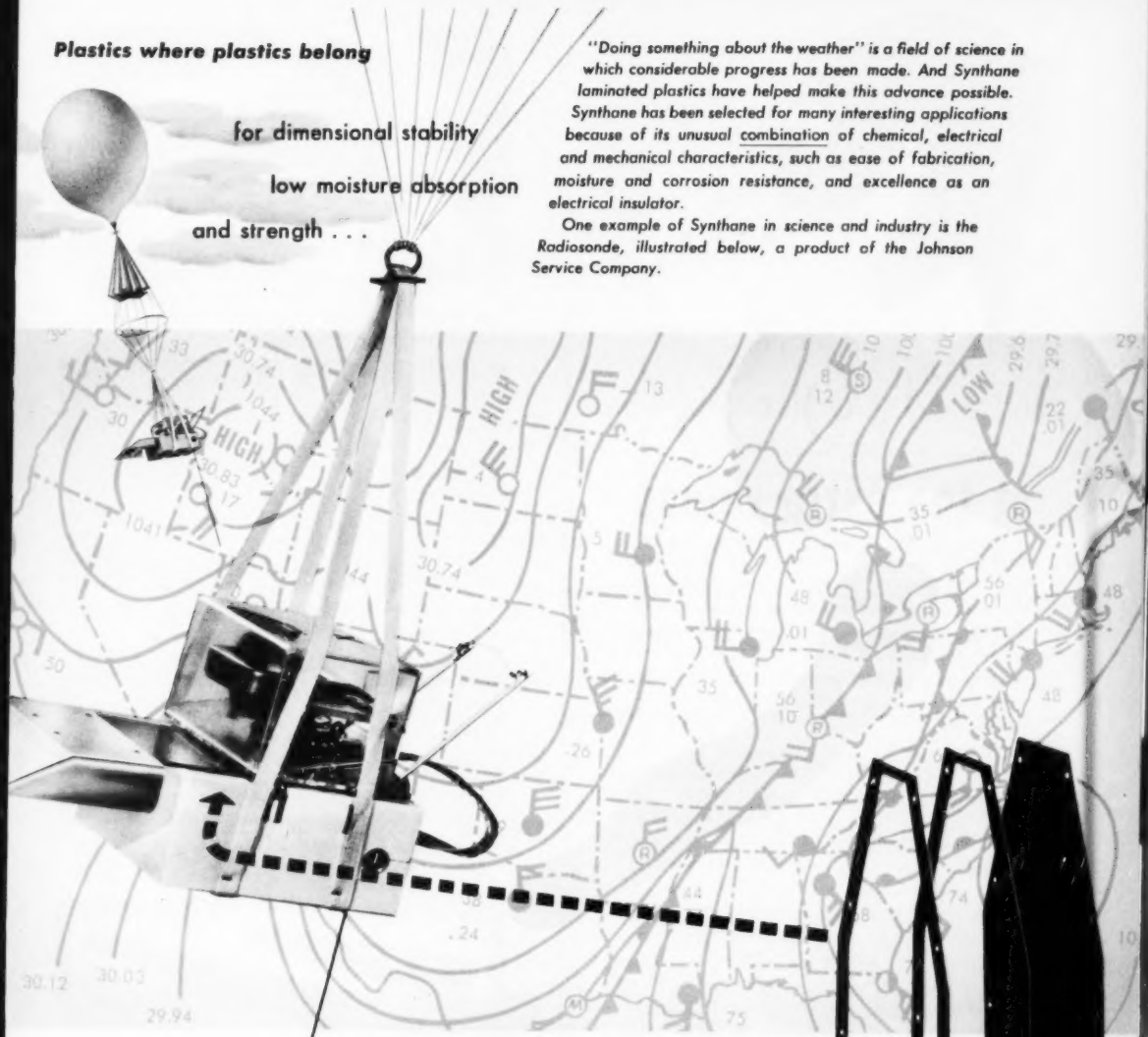
for dimensional stability

low moisture absorption

and strength . . .

"Doing something about the weather" is a field of science in which considerable progress has been made. And Synthane laminated plastics have helped make this advance possible. Synthane has been selected for many interesting applications because of its unusual combination of chemical, electrical and mechanical characteristics, such as ease of fabrication, moisture and corrosion resistance, and excellence as an electrical insulator.

One example of Synthane in science and industry is the Radiosonde, illustrated below, a product of the Johnson Service Company.



The Radiosonde may ascend as high as 140,000 feet, encounter temperatures as low as −60°F., and meet relative humidities up to 100% while sending back complete information about temperature, humidity and barometric pressure.

The materials of which it is built must be stable, impervious to moisture, resistant to fungus growths, light and strong. Synthane was selected because it meets all these requirements and is easily fabricated.

These characteristics of Synthane may suggest its use in your product or process. If so write us today for more information without obligation. Synthane Corporation, 8 River Road, Oaks, Pennsylvania.

SYNTHANE

where Synthane belongs

SHEETS • RODS • TUBES • FABRICATED PARTS • MOLDED-LAMINATED • MOLDED-MACERATED



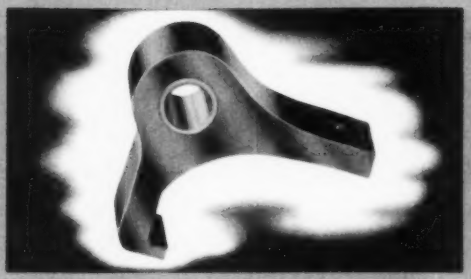
LOOK

at the extra values

Over at the right are four parts made of Synthane laminated plastics. Synthane was selected for these important jobs because of one or two mechanical, chemical or electrical characteristics. In each application the user found that Synthane was not only a better material in the major requirement but it gave him a valuable and desirable extra by reason of other beneficial properties. This is true of almost every Synthane application because our type of laminated plastics is unusual for its *combination* of values.

Synthane is strong, light, hard, and dense. An excellent electrical insulator, it has high dielectric strength, low dielectric constant, and low power factor. Highly resistant to moisture, abrasion, corrosion, and wear, Synthane is easily worked on production equipment. It is a *set* plastic, dimensionally stable over wide variations of temperature.

If these few of Synthane's many desirable properties and abilities suggests its use in your product or process, clip and mail the coupon today, let us help you with materials, design or fabrication of parts.



Distributor Breaker Arm. *Manufacturer sought good wear resistance and electrical insulating ability. His extra values: Impact fatigue resistance, low moisture absorption, vibration absorption.*



Piping for Nylon Sizing Machine. *Designer needed good corrosion resistance. His extra values: Light weight, strength.*



Vee Belt Pulley. *User required light weight. His extra values: Wear resistance, stability, low power loss, reduced lubrication problem.*



Hosiery Examining Form. *Processor looked for smooth, non-sagging surface. His extra values: Rigidity, light weight, black finish all-the-way-through, freedom from warping, hardness.*

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Please send me without obligation a complete catalog of Synthane technical plastics.

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Playtime Clock

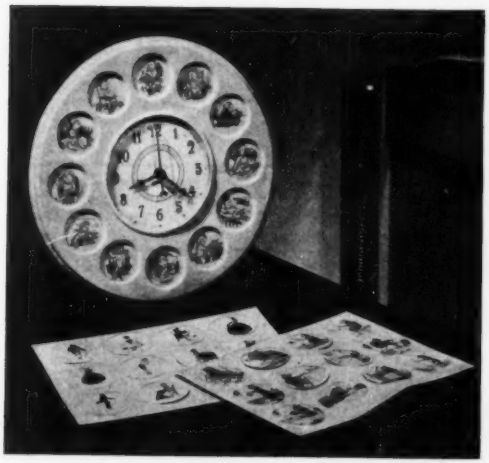
AN electric clock whose plastic front has 12 circular openings around the dial for insertion of educational or entertaining pictures is being manufactured by The Dow-Gunther Co., Div. of Aristocrat Clock Co., New York, N. Y. Intended for use in the nursery or a child's room, the Picturetime clock is available in pink, blue, or ivory color.

Waterbury Companies, Inc., Waterbury, Conn., produces the front of Celcon ethyl cellulose in a single cavity injection mold. This circular front measures 8¼ in. in diameter; the 12 openings — one by every hour — each measure 1¼ in. in diameter.

Three sets of prints for varying age groups are supplied with each clock. One set shows a baby's day around the clock. A second set for a small child shows activities of a bear. A third series consists of early American silhouettes. Unlimited possibilities are offered as visual aids; parents may insert a wide variety of pictures as often as desired and in a matter of minutes. How to tell time, identification of plants and animals, health and manner reminders are among the instruction possibilities. Later, children themselves can insert family snapshots, photographs of movie stars, ball players, etc. Pictures are changed by snapping out the metal disks in the back of the plastic piece.

The clock has a sweep second hand and is operated on 110-120 volt, 60 cycle, AC circuit. If power should fail, the clock automatically starts again when power is resumed. The case and stand are metal, finished in baked enamel to match the plastic front.

Ethyl cellulose is used to mold front of child's clock. Educational or entertaining pictures are supplied with clock





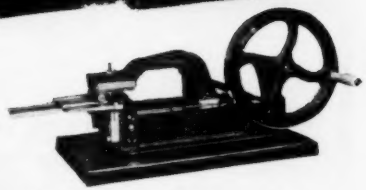
Then you'll want to investigate *Ferro's inorganic colors*—ideally suited for compression and injection molded plastics. Select from full color range. Colors stable (to 2300 degrees Fahrenheit) and highly chemical-resistant. Write for further details and samples.

Color Division

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Apex Standard Hand Printer Model A-10

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White Mineral Oil,

by R. K. RHODES*

HIGHLY refined U.S.P. white mineral oils serve, in the main, as plasticizers or plasticizer extenders, softeners, or lubricants for hard, tough, brittle, intractable, high molecular weight resins, rendering them homogeneous, flexible, and workable at room or operating temperatures.

White mineral oils, as in the case of other plasticizers, are usually incorporated into the resin during the hot roll mixing operation at the same time that the fillers and pigments are also combined with the resin to form the finished plastic. The resulting material is then either sheeted, powdered, or chipped for further processing into molded or extruded plastic articles of commerce.

The amount and kind of plasticizer to be used in any particular case will depend on the plastic and the intended use to which it will be put. The table below indicates the amount and viscosity of white mineral oil required for specific functions with the thermoplastics listed.

Plasticizer must be stable

All unsaturated hydrocarbons and other impurities must be completely removed to render the oil fit for a plasticizer for the resins in question, because it is these impurities which are capable of reaction to form sticky, gummy compounds. These unsaturated hydrocarbons are also reactive under heat and light. Obviously, a plastic using an unrefined oil as the plasticizer will not be very stable. All white mineral oils used as plasticizers for the resins listed in the table should be free of unsaturated hydrocarbons and have a minimum tendency to oxidize or sludge, as determined by the Michie Sludge Test and the Sligh Oxidation Number.

In order to determine to what extent the unsaturated hydrocarbons have been removed from a mineral oil, the so-called acid test is generally employed. This test, established by the U. S. Pharma-

*Dept. of Industrial Research, L. Sonneborn Sons, Inc., New York, N. Y.

Resin		Viscosity and Quantity of *Saybolt viscosity at 100° F. of suggested oil* sec.
	Ethyl cellulose	200/210
	Nitro cellulose	200/210
Polymers and copolymers	Vinyl chloride	80/90
	Vinylidene chloride	80/90
	Coumarone resins	335/345
	Terpene resins	335/345

*Quantities indicated represent the average amount of white mineral oil which is required for the function. The suggested quantities may be increased

a Selective Plasticizer

copoeia, is designed to show the true degree of refinement of an oil. Five milliliters of the oil are heated with 5 ml. of 94.5 to 95.5% sulfuric acid in a water bath for 10 min. and the mixture shaken at intervals of 30 seconds. When the test is applied to partially refined oils, the acid will turn dark yellow, brown, or even black, but with a true white mineral oil the color will change only slightly.

The ability of an oil to "stay put" in the plastic is largely determined by its vapor pressure and evaporation loss. These properties are in turn dependent on the initial boiling point and distillation end point of the white mineral oil. The white mineral oils under discussion have initial boiling points above 600° F. and distillation end points of approximately 760° F. It is, therefore, obvious that the vapor pressure is very low and hence there cannot be any evaporation loss. The plasticizer cannot evaporate from the resin, thus insuring continued plasticity during the life of the resin.

No fire hazard

White mineral oils recommended as resin plasticizers, because their flash points are above 350° F. and their fire points above 400° F., do not add an additional fire hazard to manufacturing operations. Because of this fact, they are particularly satisfactory as certain resin plasticizers.

Highly refined U.S.P. white mineral oils are colorless, or water white, with a Saybolt color of 30+. Such an oil, because it is initially colorless and has a high order of stability so that it cannot develop color, will not impart color to even the lightest plastic.

In short, white mineral oils find application as plasticizers for certain resins because they are completely refined and are thus stable to oxidation and sludging, have high boiling points and low volatilities, are stable to light and heat, present no fire hazard in their use, and do not discolor even the lightest colored plastic.

White Mineral Oil Plasticizer

Function	*Amount required* (by wt. of resin)*
	%
Plasticizer and lubricant	20/25
Softener and lubricant	2/3
" "	1/2
" "	1/2
Plasticizer and lubricant	5/10
" "	5/10

* or decreased in accordance with the ultimate degree of plasticity which is desired by the user.

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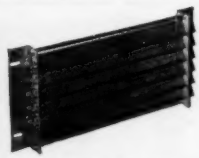
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If you have a custom molded plastics job on blueprints . . . or merely in mind . . . phone your nearest Watertown man today . . . or phone or write us directly. Here are the Watertown men . . .

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Cleveland—Carl F. Linn, 866 Hanna Bldg.
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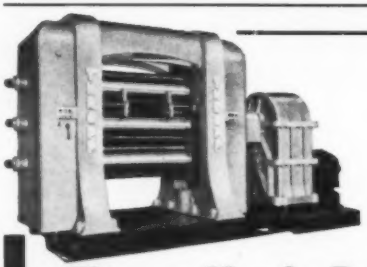
- Highly abrasion resistant (30-40 times more so than acrylic).
- Extraordinarily resistant to all acids, reagents, organic solvents, salt water, gasoline fumes, etc.
- Excellent impact resistance. High heat distortion point.
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Illustrated above is the latest Thropp 24" x 66", 3-roll (or 4-roll) heavy duty Calenders.

Some of the outstanding features included in these new calenders are: direct drive, eliminating master gear and pinions; roll necks mounted on self-aligning roller bearings; circulating roll neck lubrication which will withstand exceptionally high temperatures; all cut herringbone tooth gears; enclosed, roll adjusted mechanism; ease of control and minimum maintenance. For full details, send for specification folder.

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- *Export Agent:* Steinhardter & Nordlinger, 105 Hudson St., N. Y.

THROPP

WM. R. THROPP & SONS CO. Trenton, N.J.



COURTESY PREMIER INSTRUMENT CORP.

Main part of camera flash unit housing is molded of polystyrene, back piece is fabricated of black acrylic sheet

Camera Flash Unit

ONE polystyrene and one acrylic part form the housing for a new flash unit made by R. A. Simerl Mfg. Co., Madison, Wis. The unit, known as the Sims Model D-1, can be used on Leica, Russian Leica, Japanese Nicca, and Kardon cameras. It is shown above in place on a Kardon camera.

The main piece of the housing is molded of polystyrene by Economy Precision Products Co., Germantown, Wis. The piece is 2⅝ in. wide, 2⅜ in. high, and 1⅜ in. deep. All wall sections are ⅛ in. thick, except where the two interior partitions meet. At that point, there is a ¼-in. thick section to provide space for a Dodge insert for the cover mounting screw.

The molded-in partitions divide the interior into three compartments. The left compartment, which extends the full height of the case, holds the bat-

teries. The upper right section houses the standard base socket for flash bulbs. Most of the controls are installed in the lower right section. This section also has a rib against the side wall with a hole molded into the rib.

The mottled piece in the accompanying photograph shows what the polystyrene part looks like when it comes from the mold. After molding, and prior to assembly, 22 holes are drilled in the piece, five slots are machined, one undercut is completed, and the bottom of the central partition is broken through for two contacts. Thirteen of the drilled holes are to accommodate Parker-Kalon drive screws. One hole 1⅛ in. in diameter is cut into the top of the case for the flash bulb socket.

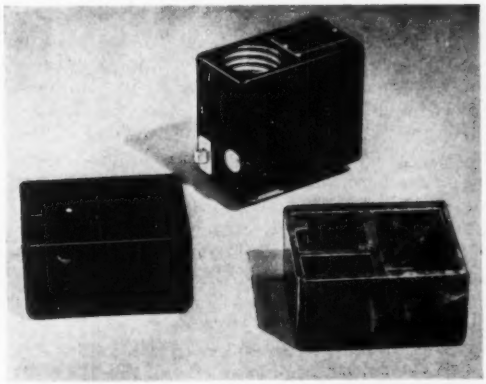
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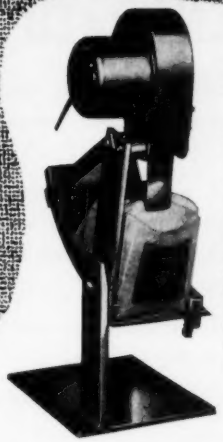
During machining, the case is held in a special fixture which holds it from the inside, thus avoiding abrasions on the exterior surfaces which would later have to be buffed. The total time required for finishing each case is 17 minutes. This time could have been reduced by incorporating some of the slots and holes in the mold, but the number of units to be produced was not high enough to justify the greatly increased mold costs which would have resulted.

The back cover of the unit is fabricated from ⅛-in. thick black opaque Plexiglas. Six holes are drilled in the piece: four for the reflector bracket holder, one for the mounting screw, and one large hole which allows the user to observe the pilot light.

The thick wall sections and the ribbed construction of the polystyrene case result in an exceptionally rugged piece. The manufacturer states that no cases have been damaged during the manufacturing operations, and no cases have been returned by customers or retailers for replacement.

Polystyrene housing has 22 holes and five slots machined after molding. Piece is shown at right before machining





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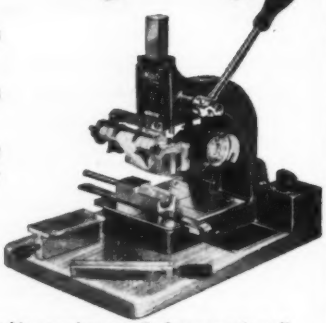
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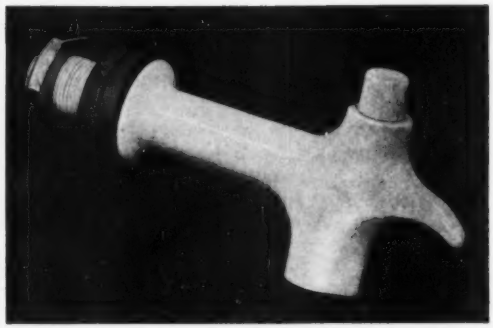
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Push-button type polystyrene valve has metal jam nut and rubber washers. Hook on valve makes it easier to grip



Valve at right is fabricated from nickel-silver casting. Black, transparent, and ivory valves are all polystyrene

Costs Cut, Sales Boosted

WHEN the Reid Valve Co., Los Angeles, Calif., first began to investigate the possibility of using plastics to make its push-button type liquid dispensing valves, its motive was simple: it wanted to cut production costs. But when the company finally adopted polystyrene as a material, the results were more far-reaching than the company had expected. Not only were production costs reduced, but customers were able to cut maintenance costs 300%—and sales increased 35% in a year.

The Reid valve was originally developed in 1939 to replace a conventional type of liquid dispensing valve which had a shut-off running completely through the main bore from top to bottom. Such valves often developed leaks where the turning spigot emerged from the body of the valve. The Reid valve was thus designed with only one opening in the bore, with a shut-off force applied from outside. The opening is sealed with a rubber stopper which is attached to a push button and held in the closed position by a spring. The stopper allows the liquid to flow when the button is pushed but returns to the closed position as soon as the button is released.

The first production models of the Reid valve were made of nickel-silver castings. These had to

be machine finished, drilled, and chrome plated. The finished product was widely accepted in the retail wine business and for dispensing spring water from the pottery containers known as ollas which are widely used in Southern California.

Because of the rising costs of metal after the war, Reid decided to shift to plastic. Polystyrene was chosen as the material and an eight-cavity mold was made to mold four valve bodies and four push buttons. Plastic Die & Tool Corp., Los Angeles, designed the mold, which was constructed by Arrow Tool & Engineering Co., Los Angeles.

The mold is run by Plastic Die & Tool on a 4-oz. HPM injection machine at a cycle of approximately 100 shots per hour. This relatively slow production rate is necessary because of the thick finger-grip section at the front end of the valve.

The first result of the adoption of polystyrene was the elimination of the drilling, machining, plating, and finishing operations. The uniformly precise dimensions of the molded parts also decreased assembly costs. There was a reject rate of 5% on the metal castings; this was not encountered in the molded plastic parts.

Because of all these economies, the plastic valve has a retail price of $1.25, as against $2.25 for the metal valve. In the first year after the introduction of the plastic valves they outsold the metal ones by a 10 to 1 ratio. The preference for the plastic valve became even stronger when water companies discovered that the absence of corrosion in the plastic valves and the ease with which the smooth water passage could be cleaned resulted in a 300% reduction in maintenance costs.

—*Robert A. Cooper*

Operator is installing one of the new polystyrene valves in a pottery olla used for dispensing drinking water



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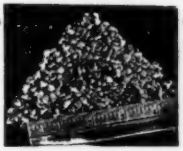
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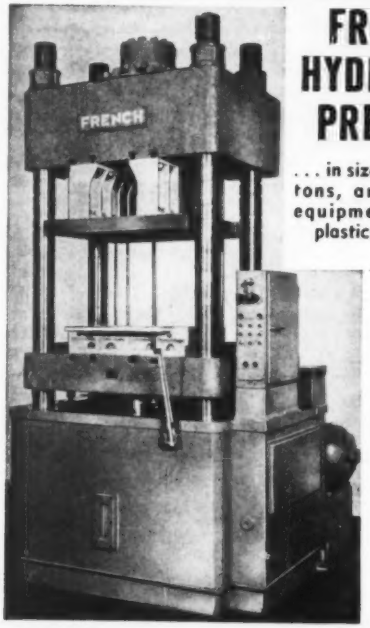
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Vinyl Spread Coating

(*Continued from page 89*)

plus exact temperature control with the aid of a percentage timer, assures uniform heat at the nip. The slight pressure used molds the coating into a permanent grain or pattern. The cloth passes from here directly to two cooling rolls and immediately onto the wind-up roll. It is claimed to be one of the simplest and most compact embossing and wind-up operations yet devised, and the results achieved, at least insofar as hand and appearance are concerned, have excited the customers no end.

This embossing technique is not necessarily limited to applications where fiber glass heaters are involved, although the only installation of this type in the United States is equipped with these heaters. The idea has not yet been widely accepted in this country because many manufacturers consider it uneconomical unless large production runs of a single coating weight and embossed grain are involved. Most manufacturers prefer to separate the embossing stage in order that their coating unit will not be tied up while embossing roll changes are being made.

Roll speed control

Coating heads and heating units thus far described in this series of articles are the backbone of the equipment needed in a vinyl spread coating plant, but the methods for using them and the auxiliary apparatus needed to make them work satisfactorily are various and sundry. For example, feed and wind-up rolls must be provided at the beginning and end of the coating process and their speed carefully regulated in order to control the tension of the moving web. Since the diameters of the feed and wind-up rolls are constantly changing, brakes are used on the feed roll to help hold a constant tension and a clutch is employed on the wind-up roll to help maintain a constant speed. A simple hand set brake is usually used but machinery manufacturers are trying to convince the fabric coaters that in the interest of speed and quality they should adopt the technique of the paper coaters or vinyl calenderers who frequently use a fluid drive on the fabric roll.

In wind-up technique, the most customary system employs a draw roll, a cooling roll, an idler bar or expansion roll to remove wrinkles, and the final wind-up roll. Since the circumference of the wind-up roll is constantly growing as the amount of fabric wound around it increases, each revolution tends to pull more cloth off the machine.

In order to keep the take-off speed at a uniform rate, the wind-up roll shaft must revolve at reduced r.p.m.'s as the roll grows larger. To meet this contingency, it is customary to have some sort

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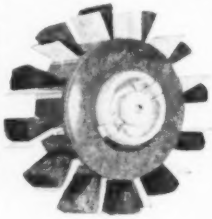
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of a friction slip clutch. One method is to employ a rider roll connected to levers which in turn control a variable speed drive that regulates the speed of the shaft as the roll gets larger. In one of the simplest wind-up methods, the wind-up roll is placed on top of the draw roll and held by weights or spring pressure in uniform contact with the driven roll. Sometimes a second roll is employed and set on a horizontal plane with the draw roll so that the wind-up roll can ride between and above them.

Manufacturers of hydraulic units assert that the most satisfactory method for handling these problems is to install hydraulically operated wind-up and feed rolls. It is even claimed that one hydraulically operated wind-up roll will wind from a free loop, thus avoiding practically all tension.

Full fluid hydraulic drives, using circulating high pressure oil for power transmission and employing pumps instead of generators and fluid motors in place of electric motors are also advocated. It is claimed that this system will eventually prove just as superior in the fabric coating industry as it has in the paper coating field. All mechanical components remain unchanged except the driving elements. The power is developed in the form of a volume of oil under controlled pressure. Variations in the rate of fluid flow govern the speed directly, and variations in pressure directly affect the applied tension of the system.

The manufacturer of this hydraulic equipment also advocates widespread use of float rolls—one set at the feed or let-off roll and another at the wind-up roll—to control speeds. These units are essentially a group of two upper fixed idler rolls and one idler roll free to travel in suitable guides in a vertical plane. The traveling roll is supported in a loose loop in the fabric. As the loop length changes, the position of the free idler roll varies. Obviously, if more or less material enters the loop than leaves it, the difference causes the float roll to raise or lower and thus continuously measure the speed difference in the material entering the loop and leaving it.

Other equipment needed

Auxiliary equipment of many sorts is needed to operate a coating plant. Mixing equipment is a must. Ready mixed compounds are available from many suppliers but most suppliers recommend that their customers buy unpigmented compound so that they can meet their various color requirements and avoid losses due to spoilage when a container is opened but the contents not entirely used up on a given job. Many coaters also buy low plasticized organosol to use as a base solution and then add pigment and additional plasticizer.

Such compounds are generally prepared simply by stirring with power driven paddles or Lightning mixers that have impeller shaped blades.

One prominent plastisol manufacturer says that plastisols can be mixed in open mixers in quantities of from 10 to 50 gal. per batch. The cycle involved depends entirely on the mixer although an average of 1 hr. would be approximately correct. With such mixers no operator attention is necessary except for loading and discharging.

Strangely, despite all the other expensive items needed, such as embossing equipment, inspection machines, etc., it is also true that a man can get into this business on a relatively small amount of capital if he has enough technical savvy. This is especially true if the aim is to produce a specific line of coated fabrics and not to try to cover the entire field. Working in this way it is possible to enter the coating business with only a coating and fusing unit equipped with appropriate let-off and wind-up equipment, together with some means of embossing. Simple and inexpensive mixing equipment would enable the operator to either pigment a purchased neutral compound or to prepare his own compounds starting with the basic vinyl resin. In any event, equipment can be purchased and assembled at moderate cost with good results if properly operated, but the most elaborate equipment on earth is practically useless in the vinyl spread coating field without the guiding hands and brains of experienced technicians.

Acknowledgments

A large portion of the information on equipment described in this article was obtained from the following suppliers of equipment, compounds, and resins:

Equipment—J. O. Ross Engineering Corp., New York, N. Y.; Industrial Ovens, Inc., Cleveland, Ohio; Industrial Radiant Heat Corp., New York; John Waldron Corp., New Brunswick, N. J.; Union Process Co., Akron, Ohio; Frank W. Egan & Co., Bound Brook, N. J.; Meadows Machine Works, South Kearney, N. J.; Mixing Equipment Co., Inc., Rochester, N. Y.

Compounds and resins—Jones & Dabney Div., Devoe & Raynolds Co., Inc., Newark, N. J.; Bakelite Corp., New York, N. Y.; B. F. Goodrich Chemical Co., Cleveland, Ohio; Gordon Lacey Chemical Products Co., Inc., Maspeth, N. Y.; Atlas Powder Co., Stamford, Conn.; Vinyl Products Ltd., Surrey, Eng.

Our Apologies: We hasten to correct a credit-line error which appeared with the photograph of a typical knife coater, page 85, October issue. The correct credit-line is: "Courtesy The Glenn L. Martin Co. and Blackburn Products, Inc."

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Effect of Exposure

(*Continued from page* 110)

correlation between the effects of accelerated weathering and outdoor exposure. Another discrepancy between the effects of accelerated weathering and outdoor exposure appears in the impact results. Accelerated weathering caused the impact strength of sample No. 3 to drop 70%, while outdoor exposure caused no significant drop in this property. In the case of material No. 19, a cotton fabric base urea-phenol-formaldehyde laminate, the decrease in both the flexural strength and modulus after accelerated weathering were similar to the changes which occurred after outdoor exposure. The accelerated weathering test is therefore a good indication of the effects of outdoor exposure on flexural properties for this particular material. The fact that no single accelerated test will predict the effects of weathering for all plastic materials is substantiated by previous work.[1,2]

The wet strength after 24 hr. water immersion of seven of the materials is compared with the as-received properties in Table IV. This test does not correlate with outdoor exposure. The tensile, compres-

[1] "Effect of Simulated Service Conditions on Plastics," by W. A. Crouse, D. Caudill, and F. W. Reinhart, National Advisory Committee for Aeronautics Technical Note No. 1240 (July 1947).

[2] "Supplementary Report on Effect of Simulated Service Conditions on Plastics," by W. A. Crouse, D. Caudill, and F. W. Reinhart, National Advisory Committee for Aeronautics Technical Note No. 1438 (May 1948).

Table III.—Effects of Accelerated Weathering Exposure[a] on Mechanical Properties

Property	No. 3 (Ethyl cellulose)		No. 19 (Cotton fabric base urea-phenol-formaldehyde laminate)	
	Unexposed	Change after accelerated weathering	Unexposed	Change after accelerated weathering
		%		%
Tensile strength, longitudinal				
Modulus of elasticity, 10^6 p.s.i.	0.158	—5	0.481	—37
Tangent proportional limit, p.s.i.	200	+25	1200	—28
Yield strength at 0.2% offset, p.s.i.	884	.....	2900	—38
Ultimate strength, p.s.i.	3174	+21	5410	—11
Flexural strength, longitudinal flatwise				
Modulus of elasticity, 10^6 p.s.i.	0.166	—8	0.577	—47
Tangent proportional limit, p.s.i.	2500	—15	2990	—50
Ultimate strength, p.s.i.	4800	0	9620	—27
Compressive ultimate strength, longitudinal edgewise, p.s.i.	3150	+25	12900	—10
Impact strength, notched Izod, edgewise, ft.-lb./in. of notch	2.85	—70	4.5	—2

[a] Federal Specification L-P-406[b], method 6021.

Table IV.—Effects of Water Immersion on Mechanical Properties[a]

Property	No. 2 Cellulose acetate butyrate		No. 3 Ethyl cellulose		No. 6 Cotton fabric base, ethyl cellulose		No. 11 Glass fabric base, polyester		No. 18 Glass fabric base, phenolic		No. 19 Cotton fabric base, urea-phenol-formaldehyde		No. 20 Glass fabric base, urea-phenol-formaldehyde	
	As received	Immersion change	As received	Immersion change	As received	Immersion change	As received	Immersion change	As received	Immersion change	As received	Immersion change	As received	Immersion change
		%		%		%		%		%		%		%
Tensile strength, longitudinal														
Modulus of elasticity, 10^6 p.s.i.	0.185	—20	0.158	—10	0.156	.....	1.92	—19	2.32	—37	0.481	—28	1.60	—27
Tangent proportional limit, p.s.i.	700	—1	200	+20	480	.....	3570	+8	2380	+29	1200	—13	2250	+98
Yield strength at 0.2% offset, p.s.i.	2640	—28	880	+6	1200	.....	16300	—5	15200	+20	2900	—23	13800	+30
Ultimate strength, p.s.i.	4640	—25	3170	—9	4050	.....	32400	—12	24200	—8	5400	+1	29600	—19
Flexural strength, longitudinal flatwise														
Modulus of elasticity, 10^6 p.s.i.	0.215	—13	0.166	—26	0.181	—22	1.75	—24	1.66	—36	0.577	—31	1.42	—35
Tangent proportional limit, p.s.i.	2720	—12	2500	—56	1340	+7	4930	+19	5600	+1	2990	—37	2830	—2
Ultimate strength, p.s.i.	5570	—14	4800	—33	3620	+12	25000	—20	19200	—19	9600	—20	13500	—20
Compressive ultimate strength, longitudinal edgewise, p.s.i.	5140	—30	3150	—17	2180	—37	11500	—45	9300	—29	12900	—15	4800	—21
Impact strength, notched Izod, edgewise, ft.-lb./in. of notch	2.19	+165	2.85	+45	6.6	+4	26.9	—19	12.24	+7	4.5	+38	32.3	—29
Water absorbed, by weight		1.43		1.03		2.8		0.79		5.5		9.9		5.1

[a] Tested wet after 24 hr. immersion in distilled water at 77° F.

sive, and flexural strength of most of the materials drops 10 to 30% after 24 hr. water absorption, and the impact strength usually increases, in one case as much as 165 percent. The flexural strength properties of material No. 19, which dropped appreciably during outdoor exposure, were somewhat less affected by 24-hr. water immersion.

Crouse, Caudill, and Reinhart[1,2] have published data on some similar materials exposed to outdoor weathering in Washington D. C., for 1 and 2 years. One of the high strength paper base phenolics which they reported is identical to the material reported here as No. 17. For this laminate they found a drop of 35% in ultimate flexural strength and 29% in modulus of elasticity after 2-yr. exposure, which check closely with the figures determined in this investigation. The glass fabric base polyester which they tested is identical to the material reported here as No. 11, and in neither investigation was any appreciable drop in ultimate flexural strength or modulus of elasticity observed. Their results also showed a 20% drop in ultimate flexural strength for a cotton fabric base polyester and about 20% drop in flexural strength and modulus of elasticity for a cotton fabric base phenolic, while similar, but not identical, materials (Nos. 9 and 15, respectively) did not decrease appreciably in strength or modulus in this investigation.

Tests have been made by this laboratory[3] on specimens taken from transparent enclosures on aircraft after 8 to 23 months of service. Since the properties of the same sheet or lot of material in the unexposed condition were not available, only an approximate comparison may be made with the known average properties of the types of materials tested. The mechanical properties determined were tensile strength and flexural modulus of elasticity and the materials tested were transparent polymethyl methacrylate, cellulose acetate, and cellulose nitrate. The tensile strength and flexural modulus of elasticity of the polymethyl methacrylate were not appreciably affected, if at all, by the exposures, based on comparison with the known average properties. Based on similar comparison, however, the tensile strength of cellulose acetate and cellulose nitrate decreased substantially, of the order of 20 to 50 percent. However, the flexural moduli of elasticity did not decrease.

It will be noted that the flexural strength test results show a great deal of similarity between 11 months outdoor exposure in Florida and 29 months in Dayton. This does not necessarily mean that 11 months exposure in Florida is equal to 29 months exposure in Dayton. The data presented in Table V indicate that for at least one material, a glass fabric base urea-phenol-formaldehyde laminate, no significant decrease in flexural modulus of elasticity

[3] "Effect of Exposure on the Physical Properties of Transparent Plastics," by E. J. Wyrostek and W. R. Koch, United States Air Force Memorandum Report EXP-M-56-606-3280 (June 22, 1940).



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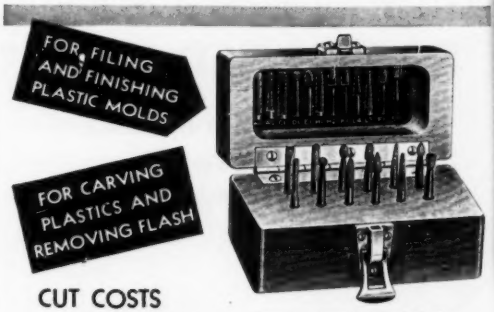
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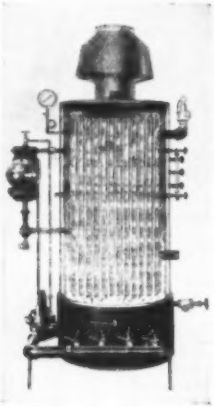
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Table V.—Variation of Flexural Strength and Modulus of Elasticity of Glass-fabric Urea-phenol-formaldehyde Laminate With Duration of Outdoor Exposure in Dayton

Property	Duration of exposure			
	Unexposed	*3 months*	*6 months*	*13 months*
Flexural strength p.s.i.	19,500	13,300	11,000	11,600
Modulus of elasticity, 10^6 p.s.i.	1.54	0.86	0.85	0.69

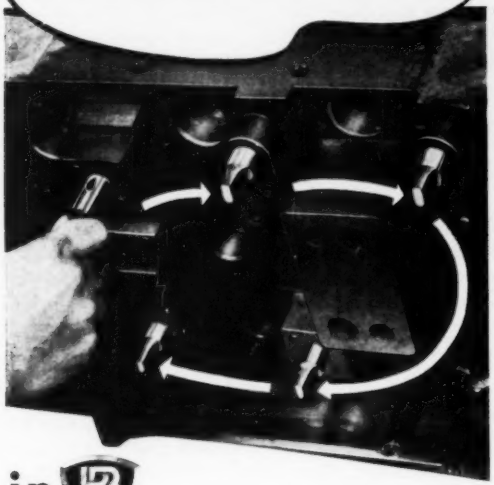
or flexural ultimate strength is likely to occur after the first 90 days exposure. Since both exposure periods reported in Table II are considerably greater than 90 days, it is quite possible that for some of the samples an equilibrium exposure strength value has actually been reported. The rate at which this

Table VI.—Increase in Warp and Twist of Weathered Panels[a]

Sample No. and description	11 months Florida exposure		11 months Dayton exposure		29 months Dayton exposure	
	Warp	*Twist*	*Warp*	*Twist*	*Warp*	*Twist*
	%	%	%	%	%	%
1. Cellulose acetate	8.9	7.7	.....	.....	.....	.....
2. Cellulose acetate butyrate	3.2	3.1	1.8	1.1	10.3	4.1
3. Ethyl cellulose	0.8	0.7	4.2	2.6	9.8	11.4
4. Ethyl cellulose	1.9	2.7	.....	.....	.....	.....
5. Ethyl cellulose	0.3	.....	.....	.....	.....	.....
6. Cotton fabric base, ethyl cellulose	0.3	1.6	.....	.....	.....	.....
7. Cotton fabric base, polyester	8.1	4.8	3.9	4.0	7.4	7.0
8. Cotton fabric base, polyester	7.0	3.9	6.1	4.9	7.9	6.7
9. Cotton fabric base, polyester	4.1	2.9	4.5	2.8	10.5	6.6
10. Glass fabric base, polyester	2.4	1.7	1.1	1.3	5.1	4.7
11. Glass fabric base, polyester	0.7[b]	0.2	1.5	1.6	2.5	1.4
12. Glass fabric base, polyester	.....	.....	0.0	0.0	—0.7	—0.3
13. Glass fabric base, polyester	0.1	0.1	0.0	0.0	0.0	0.0
14. Cotton fabric base, phenolic	2.2	1.7	2.0	2.0	2.7	1.8
15. Cotton fabric base, phenolic	.....	.....	4.4	1.6	4.8	1.3
16. Paper base, phenolic (high pressure)	0.1	0.1	0.0	0.0	—0.3	—0.1
17. Paper base, phenolic (medium pressure)	1.9	1.5	1.0	1.1	1.9	1.8
18. Glass fabric base, phenolic	2.6	0.8	4.2	3.3	8.6	6.2
19. Cotton fabric base, urea-phenol-formaldehyde	4.6[b]	1.9[b]	3.9	3.0	4.1	3.4
20. Cotton fabric base, urea-phenol-formaldehyde	3.2	1.1	3.4	2.7	7.3	5.2

[a] All values reduced to 36 in. basis. Warp and twist of the unexposed panels have been subtracted from these values.
[b] Value reported is maximum recorded and was obtained after 2½ months exposure.

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equilibrium was attained cannot be determined from the data, however, and in this respect, it is not possible to assume that the weathering periods in Dayton and Florida are equivalent. The data in Table V were taken in connection with another investigation, and the material does not correspond exactly to any of the materials described in this report, but it is considered to be quite similar to material No. 20.

The warp and twist data are given in Table VI. Warp and twist are a measure of the curvature assumed by the panels (Federal Specification L-P-406a, method 6051). The initial warp and twist of the unexposed panels were subtracted from the warp and twist of the exposed panels to give the data recorded in Table VI. The weaker panels, especially the thermoplastics, have some tendency to sag under their own weight when heated by the sun. The stronger materials such as those made with glass fabric show relatively little warp and twist after exposure. The warp and twist after 11 months exposure in Florida is of the same order as the warp and twist after 11 months exposure in Dayton. Continued exposure in general increased the warp and twist of the Dayton panels. Of the panels tested, the best from the standpoint of warp and twist were the polyesters with glass fabric and the paper base phenolics. This does not correlate with service experience as far as the paper base phenolics are concerned, since these have been known to warp in service.

Although all of the panels exhibited some apparent erosion of surface resin and some color change on the exposed surface, the appearance of

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Because of numerous requests for extra copies of MODERN PLASTICS' current series of articles on vinyl film, sheet, and coatings, reprints of the first three articles, No. 1—"Who Uses Vinyl Film?"; No. 2—"Problems of the Vinyl Film Fabricators"; and No. 3—"Improving Vinyl Film Products", have been produced for general distribution. Since these three articles deal specifically with film and film fabrication, they have been combined into one reprint, copies of which are obtainable for 50¢ each.

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11-74	11-75	11-76	11-77	11-78	11-79	11-80	11-81	11-82	11-83	11-84	11-85
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most of the sheets was considered reasonably good after extended weathering. The thermoplastics suffered very little change in appearance, the surface being only dulled after exposure. The urea-phenol-formaldehyde cotton fabric laminate (No. 19), and the Grade L phenol cotton fabric laminate (No. 14), darkened on exposure to weather, but the other laminates were bleached. No cracking, delamination, serious crazing, or other visibly serious deterioration was noted.

Tests reported by this laboratory[4] have indicated that the resistance to water absorption and the wet strength of glass fabric base polyester laminates may be improved by water resistant finishes applied to the glass prior to laminating. Weathering tests are at present under way on glass fabric base plastic laminates made with currently used types of polyester resins and with glass fabrics which have these water resistant finishes. The finishes being tested are Owens-Corning Fiberglas Company No. 113 and 114, both of which are commercially available, and both of which are applied to the glass fabric after the starch-oil binder is removed by a heat-cleaning process.

Conclusions

Of a wide variety of laminates tested, glass and cotton fabric base polyesters, cotton fabric base phenolics, a paper base high pressure phenolic, and several thermoplastics showed no appreciable effect of exposure on flexural strength or on flexural modulus of elasticity after 29 months outdoor exposure in Dayton or 11 months outdoor exposure in Miami. Glass and cotton fabric base urea-phenol-formaldehyde laminates, a glass fabric low pressure phenolic, and a high strength paper medium pressure phenolic all decreased from 25 to 45% in flexural strength and from 20 to 50% in flexural modulus of elasticity after the same exposure. One of the ethyl cellulose sheets decreased 40% in flexural modulus of elasticity after the same exposure with no appreciable change in flexural or impact strength. Other ethyl cellulose sheets were not appreciably affected by exposure. Cellulose acetate and cellulose acetate butyrate sheets decreased in impact strength but not in flexural strength or modulus.

Accelerated weathering tests correlate with these results in the case of the cotton fabric base urea-phenol-formaldehyde laminate, but not in the case of an ethyl cellulose sheet. Wet strength after 24 hr. water immersion shows no general correlation with the strength after outdoor exposure.

Measurements indicate an almost negligible increase in warp and twist for the glass fabric base polyesters and the paper base phenolics. None of the panels were seriously damaged in appearance due to exposure.

[4] "Glass Fabric Base Plastic Laminates," by J. K. Long, United States Air Force Memorandum Report TSEAM-M5258 (April 1947).



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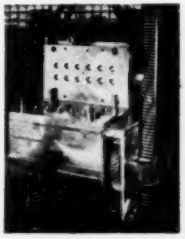
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As mold opens, horizontal rack moves internal gears, unscrewing 12 caps simultaneously from the mold cores.

Vinyl Plastisol Compounding

(*Continued from page* 114)

abnormal flow characteristics. An instrument, called the falling cylinder viscometer, was developed two years ago in our Sales Service Laboratories for studying plastisol viscosities. It is easy to use, simple in construction, and gives correlated data on the rate of shear and shearing force involved in a plastisol viscosity determination. The falling cylinder viscometer consists of four parts: a bottom disk which is pushed through the paste constituting the shearing action, a shaft to which the disk is attached, a bearing to support the shaft, and a top disk or weight platform which may be removed to lessen the shearing force or to which weights may be added to increase it. All parts are made of aluminum so that low paste viscosities may be measured. Figure 5 shows the dimensions of the parts.

The operation of the falling cylinder viscometer is quite simple. A 6-oz. screw capped bottle filled almost to the top with the paste sample is placed on a ring stand and the viscometer positioned above it as shown in Fig. 5 with the bottom disk centered in the bottle. The starting position is easily duplicated by marking the ring stand column at the proper height. The shaft is held above its bottom notch and then allowed to fall. A stop watch or timer is started and stopped over the 2-in. course marked on the shaft.

Calibration, which is easily done with liquids of known viscosity, gives an instrument constant, K, used in calculating the results. The viscosity is obtained by the following expression:

Viscosity in centipoises = K (total weight) (seconds).

In running a sample, weights of increasing magnitude are chosen until the time of fall reaches approximately 1 second. The apparent viscosities obtained with a falling time of 1 sec. are relative to one another and viscosity comparisons are made on that basis. While this method leaves much to be desired from a theoretical point of view, the falling cylinder viscometer has proved to be a very useful tool in plastisol compounding.

More recently a Precision Interchemical rotational viscometer has been used for the study of paste flow properties. With this instrument it is possible to get complete flow curves obtained continuously over a wide range of shearing rates. It is also possible to calculate plastic viscosity, yield value, and coeffi-

Table V.—Fillers in Geon 121 Plastisols

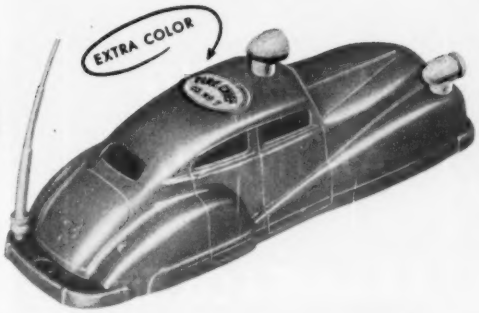
Filler[a]	*Type*	*Supplier*	*Specific gravity*	*Parts used*	*Approximate viscosity*[b] *at 25° C.*		*Tensile strength*[c]
					Initial	*1 week*	
					cp.	cp.	p.s.i.
Control	Geon 121-100 parts Flexol DOP -66 parts	—	—	—	6,000	14,000	2500
Barytes	Barium sulfate	Harshaw Chemical Co.	4.46	34.4	6,000	20,000	2200
Surfex	Precipiated calcium carbonate	Diamond Alkali Co.	2.65	20.4	7,000	16,000	2300
Superfloss	Diatomaceous earth	Johns-Manville Corp.	2.3	17.7	30,000	65,000	1900
NS talc	Talc	Innis, Speiden & Co.	2.74	21.1	12,000	25,000	2200
Suprex clay	Clay	J. M. Huber Co.	2.6	20.0	40,000	35,000	2200
Atomite	Whiting	Thompson Weinman Co.	2.71	20.9	11,000	20,000	2100
Dolomite	Calcium and magnesium carbonates	Universal Marble Products Co.	2.76	21.2	10,000	16,000	2000

[a] Filler added as an unground premixed dispersion to plastisol using the following recipe: Geon 121 = 100; DOP = 66; Filler = Volume equivalent to 20 parts by weight of a filler having a specific gravity of 2.6.
[b] Viscosity determined on the falling cylinder viscometer.
[c] Specimens prepared from 20-mil film fused 4 min. in an oven at 350° F.

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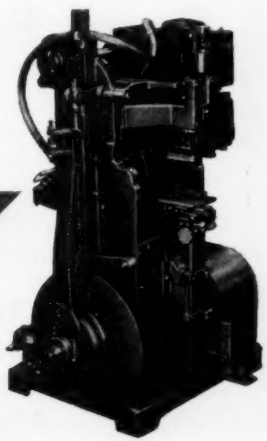
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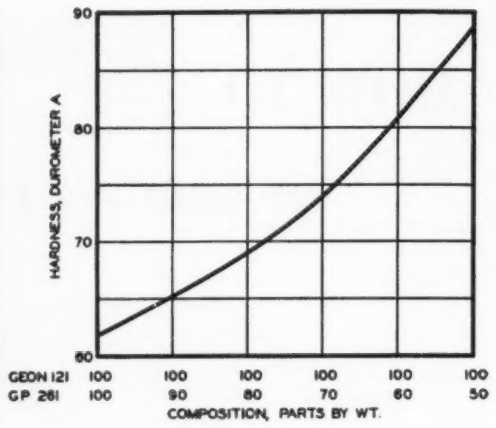
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2—Hardness of simple plastisols

cient of thixotropic breakdown. The latter is a measure of the loss in apparent viscosity of a thixotropic material which occurs over a time interval at increasing rates of shear. The values for plastic viscosity shown in Table I were obtained with this instrument.

Plasticizers

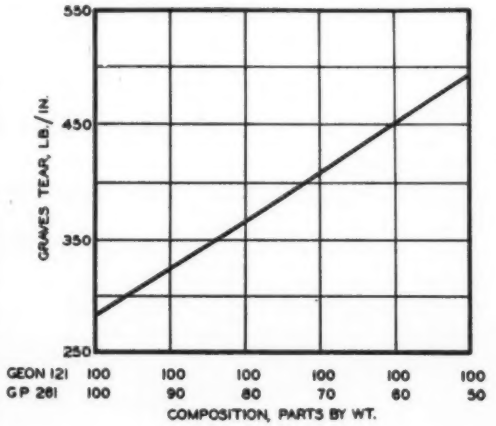
The role of plasticizers in plastisol compounding is greater than in other types of vinyl compounding because, as indicated above, the effect on the plastisol flow properties must be considered. As might be expected, the initial paste viscosity is largely dependent upon the plasticizer used. Low viscosity plasticizers produce plastisols of low initial viscosity. On aging, other factors such as the efficiency of the

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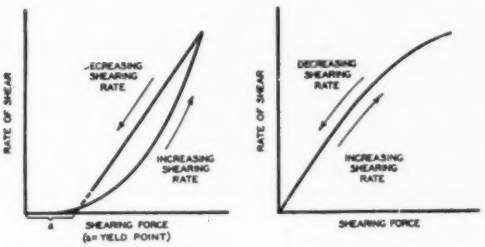
3—Tearing strength of simple plastisols



plasticizer enter in, and a plasticizer which has a strong tendency to swell or solvate the resin particle usually results in an increased paste viscosity. Conversely, plasticizers of high viscosity tend to produce higher viscosity plastisols. When it is desirable to use a plasticizer of high viscosity, such as a polymeric type which might be preferred for its nonmigratory properties, plasticizer blends may be utilized to obtain satisfactory flow properties.

The same criteria used in classifying plasticizers in ordinary vinyl compounding as "primary" or "secondary" apply in paste compounding. The heat and light stability and tensile strength of the fused plastisol is affected differently by different plasticizers and advantage may be taken of the outstanding properties of various plasticizers by using combinations.

The effect of various primary plasticizers, when used as the sole plasticizer, is shown in Table II. The plastisols were made by stirring together 100 parts of Geon 121 and 65 parts of plasticizer in a dough type mixer for ½ hour.



1—Thixotropic and dilatant flow

Tricresyl phosphate is not particularly desirable as a sole plasticizer for Geon 121 plastisols because of its tendency to produce rather highly dilatant pastes. However, TCP may be blended with other plasticizers to reduce this effect while at the same time retaining much of its flameproofing qualities. Combinations of primary and secondary plasticizers are illustrated in Table III. Combinations of this type enable the formulator to reduce compound cost with little loss of the desired end properties.

Stabilizers

Stabilizers are important in any vinyl compound. This is no less true in compounding plastisols. It should be remembered also that every resin-plasticizer-stabilizer system is specific in its net result; that is, a stabilizer which gives the best results with one plasticizer may not do so with another. In plastisols, stabilizers have been found to affect paste vis-

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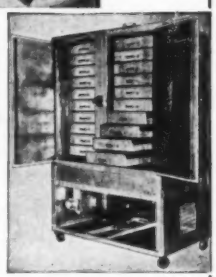
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cosity as well as the capacity and physical properties of the fused product. Moreover, there is usually an optimum stabilizer concentration above or below which inferior stabilization is achieved.

Stabilizers are available in both liquid and solid form. Solid stabilizers may be three-roll or ball-mill ground in plasticizer to form a paste which is then added to the plastisol in the early mixing stages, making allowance for the plasticizer content of the stabilizer dispersion. Liquid or paste stabilizers may also be added along with the plasticizers.

Plastisol stabilization is desirable both with respect to heat and light exposure but usually one or the other is emphasized depending on the application. Because of the relatively short heat history involved in plastisol processing—compared with other vinyl processing methods—heat stabilization requirements are materially reduced. It should be pointed out that a good heat stabilizer is not necessarily a good light stabilizer and vice versa. The heat and light stability performances of several typical stabilizers used in a simple plastisol is shown in Table IV.

Fillers

Fillers afford a means of reducing the raw material cost of a plastisol. When used judiciously, they need not detract from the performance of the product and often contribute desirable properties not otherwise attainable. For viscosity considerations, it is well to choose fillers of low oil absorption. It is recommended that they be incorporated as a dispersion which is first pre-ground in vinyl plasticizer. However, it is possible to add fillers in the dry form if mixing conditions are ideal. Fillers may be expected to increase plastisol viscosity. They also alter the flow properties so that a degree of dilatancy or thixotropy may result, depending on the filler used. This can be put to advantage if correlated with the method of application contemplated. Two end properties affected are surface tack and tensile strength which are usually reduced.

Since fillers vary widely in specific gravity they are best compared on an equal volume basis. Table V lists the results which can be obtained from plastisols—each plastisol containing an equal volume of a single filler.

Pigments

Pigments which are satisfactory for other types of vinyl compounding are generally satisfactory in plastisols. They should be added in the form of preground dispersions which can be made with a ball or three-roll mill. It is also possible to obtain pigments already ground in standard type plasticizers from color suppliers. Pigments of high tinctoral power need only be added to the extent of a few parts per hundred of Geon 121 paste resin. Lower



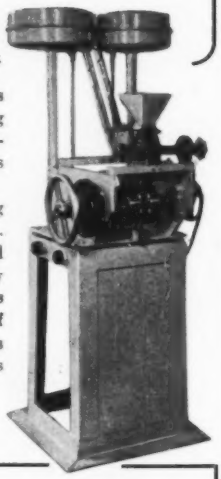
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color strength pigments, such as the natural oxides, may be used up to 10 or 15 parts and when combined with fillers should be used in nearly equal proportions if crease whitening is a factor.

Test methods

Paste viscosity.—Falling cylinder viscometer: A series of apparent viscosities are obtained by using increasing weights until a falling time of approximately 1 sec. is reached. The apparent viscosity is the ratio of shearing force to shearing rate and is a "one-point" measurement.

Precision interchemical rotational viscometer: A series of readings are taken at increasing and then decreasing speeds. The "plastic viscosity" which is obtained is the shearing stress in excess of the yield value which will induce a unit shearing rate.

Hardness.—Shore Durometer A Hardness Meter.

Tensile strength.—Twenty-mil films coated on ferrotype with a draw bar of 1/32-in. clearance. Films fused at 350° F. in a circulating-air oven. Tensile strength measured on Scott 1P 4 Tester using die cut ¼ by 6 in. film strips.

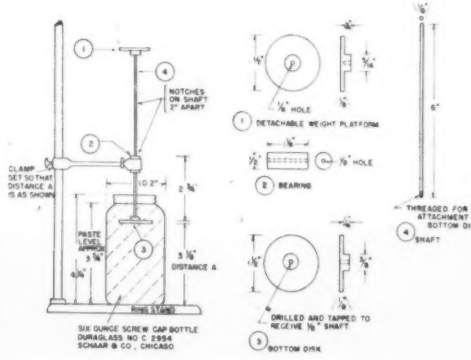
Graves tear strength.—ASTM D 624-44 (Die C).

Elongation.—Determined on 20-mil films using a Scott L6 Tester, the film being cut with ASTM Die C.

Heat stability.—Aluminum molds ¼ in. thick containing cavities 1/16 in. deep are used. One cavity in each of four molds is filled with plastisol and the molds are placed in a circulating-air oven at 350° F. The molds are removed at the intervals shown and plunged into cold water. The color developed is compared with a control recipe.

Light stability.—Films cast on ferrotype (see tensile strength) and fused 3 min. at 350° F. Strips ½ in. wide are cut out, mounted in masks, and exposed in the Atlas Fadeometer for successive time periods of 20 fading hours. Time of initial color change and final breakdown is noted. Final breakdown is characterized by film turning black.

5—Falling cylinder viscometer



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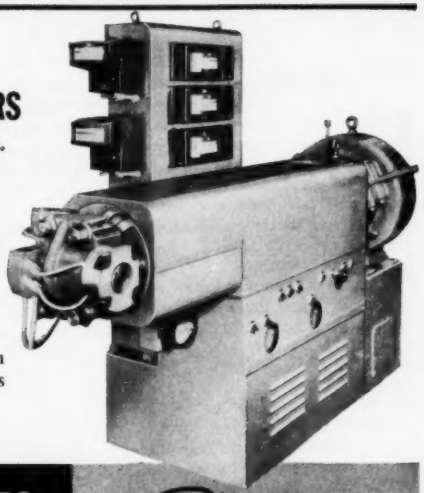
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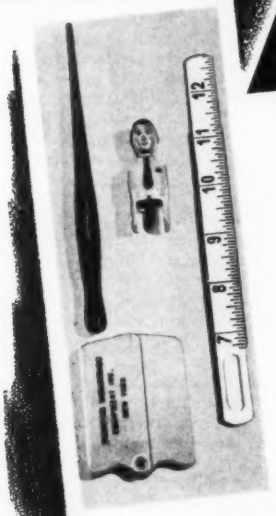
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THE PLASTISCOPE*

INTERPRETATIONS OF THE CURRENT NEWS

By R. L. VAN BOSKIRK

Phenolics pick up

ACCORDING to a MODERN PLASTICS telephone survey, phenolic molding powder production has shown a steady increase since it reached a post-war low, estimated at less than 5 million lb., in July. The low was partly due to shutdowns and vacations.

It is now believed that August production was between 7 and 8 million lb.; September, 9 million; and that October and November may run between 10 and 12 million lb. each. A seasonal drop in December of 1 million lb. or so is expected. This estimate is subject to revision dependent upon the outcome of the steel strike.

The increased production is due largely to the replenishment of a depleted inventory on the part of both molders and parts users, in the opinion of sales managers who were interviewed. Nearly all orders taken during this late summer and early fall period have been for immediate delivery.

The molding powder is apparently being used for items long familiar to the phenolic molding powder trade. Wiring devices in particular have made a good comeback, and there is a noticeable increase in table model radio cabinets. A radio executive says an actual shortage has developed. Molds for several new models have been designed, with orders running up to 10,000 or 15,000 cabinets per mold. Television and record player cabinets are in the same category. The washing machine agitator business has also picked up, with the industry announcing that it has upped its production expectations for 1949 from 2,500,000 units to 3,000,000.

The closure business has shown considerable improvement, and manufacturers are inclined to believe that they will hold this market for a great many years to come despite the threatened inroads made by other materials. They believe that dimensional stability is a property offered by thermosetting materials that some of their threatening competitors cannot match.

Large molded pieces—The extensive efforts being made to promote the use of phenolic in large molded pieces is moving slowly, but progress is noted. Large television sets in particular are going into phenolics, and such things as cabinets for air conditioning window units are under way. Window sills with tracks for slide windows are coming along in volume.

Despite these gains, it is not anticipated that the industry will soon ship up to the 20 million lb. a month mark made in one month during 1948. When the industry may have a need for its estimated capacity to produce 25 million lb. a month is also a question on which no raw materials supplier will venture a guess.

S.P.E. prize papers

NATIONAL prize winning papers in the third consecutive annual S.P.E. contest—closing date Nov. 1—will be announced at the National Convention to be held in Cleveland, Ohio, during January 1950. The prizes, according to a report from the society's national office, 409 Security Bank Bldg., Athens, Ohio, will be $200, $100, and $50 for the three top papers. Local prize winning papers will be announced at local section meetings during December.

Acrylate from molasses

BLACKSTRAP molasses can be used to produce acrylics at lower than current cost, according to Dr. Robert S. Aries of the Polytechnic Institute of Brooklyn in a paper delivered before the last meeting of the American Chemical Society at Atlantic City. Dr. Aries says that the blackstrap molasses can be fermented to produce lactic acid which is then reacted with methanol and later with acetic acid to form methyl acrylate. The process would make 2 lb. of acrylic per gal. of molasses, according to Dr. Aries.

Another plastics item described at the Chemical Society meeting was a vinyl raincoat for protecting concrete structures and cement-asbestos pipe from erosion by water and acid soils. A paper by Charles M. Bodach and J. F. Wilkes of the Dearborn Chemical Co., Chicago, Ill., reported that cement-asbestos pipe lines thus protected have completed two years of service and are still as good as new.

Improved sealers

IT is now possible to seal both short and long pieces on the same high frequency bar sealing machine, according to Mayflower Electronic Devices, Inc., 6014 Hudson Blvd., West New York, N. J., which manufactures the machine. The company can now furnish a 72-in. press for bar seal operations, which can be changed over to do 24 by 24-in. rectangular pieces by simply bolting on an attachment. In half an hour's time the machine can be changed over for either the long or short seal so that a fabricator can do rectangular pillows or long mattresses on one machine rather than having to use the two which were once necessary.

The same company has also placed in fabricators' plants several machines equipped with electric eye apparatus for the protection of the operator of dielectric equipment.

Enrup

A NEW thermosetting plastic material particularly applicable for gears and produced at a cost low enough for large volume use has been announced by the United States Rubber Co. The new plastic, called Enrup, was developed in the company's Fort Wayne, Ind., plant, where automotive materials are manufactured.

A study of the properties of the new material would indicate that it has been developed from one of the United States Rubber Co.'s high styrene-butadiene compounds (Kralac), plus one of the numerous rubber compounds now available. It is thermosetting in the sense that it cannot be ground up and reused. Its heat distortion point of 190° F. is a bit misleading because no change takes place at that temperature except that the material becomes less rigid. It will go to 250° before becoming elastic.

The material will be supplied in sheets, rods, tubes, gear blanks, and molded parts. It has demonstrated toughness, resistance to abrasion, and to the deteriorating effects of

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Ferro's #301 . . . Basic Lead Salt of 2-Ethyl Hexoate . . . provides unusually good high-temperature protection, especially when used in small quantities with #361. Minimum lubricity effects, allowing freedom of formulation.

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oil, solvents, acids, and mild alkalies. It is about half the weight of aluminum and is extremely stable at high temperatures. Enrup has good resistance to fire and its high dielectric strength makes it a good electrical insulator. One of its outstanding advantages for gear materials is that it can be molded economically in complicated shapes by either compression or transfer methods. Some gears now operating in lathes, dynamometers, etc., have been in service for as long as one year in applications where conventional metal gears have failed within a few days.

Among the material's other applications are fuel pump parts, battery cases, dies and jigs, valve seats, tumbling barrels, bearings, bushings, etc.

Some of Enrup's properties in comparison with other materials are given in the accompanying table.

Comparative Properties of Enrup

	A[a]	B[b]	C[c]	D[d]	E[e]
Specific gravity	1.3	1.35	1.5	1.1	1.2
Tensile p.s.i.	4200	9000	7000	5800	4500
Hardness Rock'l M	65	105	100	75	20
Imp. str. ft.-lb./in. notch	1.3	1.2	1.3	1.2	3.0
Water absptn. % gain/ 24 hr.	0.3	1.2	1.3	0.75	1.5
Heat distortion— °F.	190	250	250	170	150

[a] Enrup.
[b] Phenolic laminate, Grade I.
[c] High impact phenolic molding compound.
[d] Royalite.
[e] Cellulose acetate butyrate, Type I.

Armalon

ETHYLENIC plastic, a new polymer developed by Du Pont laboratories, is now being used to coat fabric for heavy duty service such as truck cab upholstery. This new material permits the manufacture of the coated fabric without use of either plasticizer or anti-oxidants. According to Du Pont chemists, it will not stiffen with age and can be used indoors or outdoors.

Called Armalon, the ethylenic coated fabrics are reported to be so tough, strong, and pliable that cushion springs broke in durability tests before any signs of failure developed in the upholstery coating.

Following its introduction in truck upholstery, Armalon will be made available for all fields of application. It is produced at the Fairfield, Conn., plant of the Fabrics Div.

Basing their statements on tests over a period of seven years, Du Pont chemists maintain that Armalon will retain its initial quality and resistance to wear longer than any other coated textile. In some service tests, for example, it has already lasted 2½ years and is still giving a good account of itself. It can be cut, sewed, tacked, padded, and formed without any special handling, and will not dry out nor mar finished surfaces such as paint or varnish. It is available for truck upholstery in both broken twill and sateen fabric constructions in a variety of colors and texture effects.

ED. NOTE: *If guesses are permissible, ours would be that the above ethylenic plastic material is basically polyethylene.*

Vinyl coated milk cartons

FIRST milk cartons to be set up from flat blanks and first to make use of a vinyl coating instead of the customary paraffin have been successfully employed by the Bowman Dairy Co., Chicago, Ill., for the past year, according to an article appearing in the November issue of *Modern Packaging* magazine. The vinyl coated paper milk carton and the special equipment for forming, sterilizing, filling, and sealing it was created by Sealright, Inc., Fulton, N. Y. It is said to represent five years of research and a $5,500,000 investment.

Among the advantages of the new Sealking carton is a reduction in shipping costs and storage requirements. Material for 2,400,000 Sealkings will store in the same space required for 80,000 prefabricated or 700,000 semi-fabricated containers.

The plastic which is coated on both sides of the paper is a specially formulated vinyl resin worked out by Sealright in cooperation with the Bakelite Corp. It is coated on 100% virgin kraft stock and printed with aniline ink over the plastic coating, using rubber plates. Bowman Dairy Co. can form, fill, and seal 70 to 75 cartons per min. on the machine leased from Sealright. It is believed that the same container can be used for fruit juices and other liquids.

The number of all-paper containers to be produced in 1949 is estimated at 4,500,000,000 units by the United States Department of Commerce. The number of such units in 1939 was only 500,000,000.

Accolade

JUDGED best of the chemical industry for the second straight year was Monsanto Chemical Co.'s 1948 Annual Report in the survey made by *Financial World*. More than 4500 corporation annual reports were submitted in this national survey, the ninth in the series, and these were judged in 100 industrial classifications for "Best of Industry" awards. In the "chemical industry" category, Rayonier, Inc., was runner-up for top honors, while Union Carbide and Carbon Co. took third place.

Another plasticizer

A FLAME-resistant plasticizer designed primarily for use with cellulose acetate and mixed cellulose esters, Flexol plasticizer 3CF (tri-2-chlorethyl phosphate) has been announced by Carbide and Carbon Chemicals Corp. Flexol 3CF is also useful as a plasticizer for nitrocellulose, ethyl cellulose, methacrylate resins, and synthetic rubber. When used as the sole plasticizer in cellulose acetate films, concentrations as low as 10% are reported to produce self-extinguishing compositions. The plasticizer pours freely below —25° C. and is less volatile than dibutyl phthalate.

Acrylic in stores

ADVANTAGES of acrylic in store modernization and merchandising aids are promoted in a "Plexiglas Store Show" being sent on tour by Rohm & Haas Co., Philadelphia, Pa. The exhibit was featured originally at the recent Store Modernization Show in New York and will have made three-day stands in Philadelphia, San Francisco, Los Angeles, Detroit, Cleveland, St. Louis, Chicago, and Boston by Christmas.

The exhibit includes applications

now! in handy new form

gypsy
PLASTIC DYES

CONCENTRATES — Designed to enable user to mix his own cold or hot dip solutions as needed. Concentrates contain no volatile solvents so can be stored indefinitely without loss or deterioration. Ten standard clear, brilliant colors or any special color mixed to order. Complete instructions furnished.

READY-TO-USE SOLUTIONS — Choice of ten standard beautiful colors, any special combination. Ready-to-use dyes for Acrylic, Acetate, Nitrate, Vinylite, Ethyl Cellulose. Available in pints, quarts, gallons.

NEW! GYPSY CEMENT

Non-inflammable, non-explosive. For Plexiglas, Lucite, Polystyrene. An excellent, clear or colored weld, solvent-type cement. Moderate setting speed permits "working" with materials when welding.

NEW! GYPSY INTERNAL CARVING DYE

Full line of beautiful pastel shades

Write for Literature and Prices

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An electric timer *controls* with split-second accuracy, hundreds of different operations in factory and home. Therefore it must be designed, made and assembled with but one thought in mind — utmost precision.

Choosing *Northern* to mold the plastic parts in Ingraham's synchronous motor that powers electric timers is another recognition by industry of one important fact — Northern designing, engineering and molding personnel are completely familiar with *all* molding compounds, know *how* and *when* to use them, and the best way to mold *each* one. The motor spool was molded of cellulose acetate, the insulator of nylon. "Plastics are Right if they're Molded by Northern", and Northern stands ready to prove it to *you*.

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not shown in the New York show and takes the form of an actual shop, complete with a back-lighted storefront and featuring signs showcases, wall cabinets, lighting fixtures, partitions, displays, and other merchandising aids.

The tour is intended to acquaint local fabricators with the sales possibilities of acrylic installations and to provide a showroom to which fabricators can bring their own potential customers.

WPB alumni meeting

A MEETING of all former members of the Chemical Div., War Production Board, and others who were associated with that group during the war period in Washington, will be held in New York on the evening of Dec. 1 while the Chemical Show is in progress in that city.

New company to produce resin treated papers

FORMATION of a new company which will engage in the production of resin treated materials under the management of T. Walter Noble has been announced. The firm, Plastics Specialties Co., is now in production in Trenton, Mich.

Mr. Noble says that his company will treat paper, fabric, sheeting, and Fiberglas cloth and mat, with such resins as melamine, phenolic, cresylic, and polyesters. The new organization will specialize for the present in melamine resin impregnated papers for the laminating industry. However, plans are such that the company may be able to tailor-make its products to customers' specifications for such applications as filter media, radio parts, aircraft tooling, etc. The tradename Lamiply will be used, with a separate letter suffix for each different item; thus, Lamiply M will designate a melamine impregnated grade.

The company is located in a new building built to prescribed specifications and requirements and has equipment of the latest and most functional design. The treating machine was designed and built so that materials can be produced which will meet the customers' most critical specifications for resin content, percent volatile, and percent flow.

Mr. Noble, has been general manager and technical director of the Morart Gravure Corp., Holyoke, Mass., and in 1947 served as president of the Detroit section of the Society of Plastics Engineers.

Chemical award

PRESENTATION of the 1949 Chemical Engineering Achievement Award will be made on Dec. 1 to the Celanese Corp. of America, in recognition of its program of postwar developments achieved in the chemical, textile, and plastics industries.

The Award was established in 1933 by the McGraw-Hill Publishing Co. for the purpose of recognizing meritorious group achievement and of calling attention to progressive companies that have encouraged broader participation of chemical engineers in affairs of the process industries. The Celanese Corp. of America was especially cited for its developments in petroleum chemistry, which resulted in the establishment, immediately after the war, of a large chemical plant near Bishop, Texas, where the company is now producing a wide range of chemicals for use in the chemical, textile, and plastics industries.

Plastic bottles

PRICES of Plaxpak squeezable polyethylene bottles in the standard Boston Round shape have been reduced 2% by the Plax Corp., Hartford, Conn., which announces that the reduction was made possible by manufacturing economies effected as a result of increased demand and expanded facilities. Plax recently enlarged its bottle making capacity and is now in a position to provide prompt delivery on all orders.

P. A. Vogel has been appointed director of sales for the Plaxpak bottle.

Adhesives for polyethylene

TWO new flexible adhesives for polyethylene-coated surfaces have been announced by Naugatuck Chemical Div., United States Rubber Co., Naugatuck, Conn. They are aqueous dispersions suitable for brushing, spraying, or roller coating and are known as Dispersite 1789, which gives a gray-brown film on drying, and 1822-A, which dries to a transparent, odorless film, suggesting its use in food packaging applications.

Both adhesives are said to have a ply strength of 10 lb. per linear in. when separated at a rate of 2 in. per minute. Among the outstanding properties claimed for these adhesives are ability to bond to smooth surfaces, flexibility, water resistance, and freedom from fire hazard during handling. Modifications of these compounds for special uses are also available.

The company believes that these adhesives, developed for seaming bags of polyethylene or polyethylene-wax coated paper, should also find use in other applications where a flexible type adhesive is required.

Army foot lockers

THE Armed Services continue to show great interest in the development of glass and polyester resin combinations. The latest item to come to our attention is an experimental contract let to the American Insulator Corp., New Freedom, Pa., by the Quartermaster for 25 Army foot lockers to be molded from polyester resin and glass cloth.

Urea glue price reduction

A PRICE reduction of ¾¢ per lb. on its BCU-22, a 50% solids, liquid urea resin glue, has been announced by Bakelite Corp. Shipment in bulk now makes possible a direct saving of 13½% as compared with delivery in drums. BCU-22 is an adhesive for furniture and commercial hardwood plywood panels.

Household circuit breakers

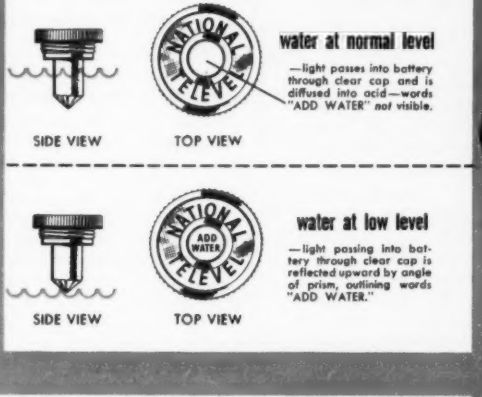
AN interesting development of a 10-yr. old product that has really blossomed only since the war, is the household electric circuit breaker now being produced in phenolic at a rate that went as high as 300,000 units a month one year ago. Even during the recent business slump, in the neighborhood of 200,000 units have been produced per month.

The circuit breakers replace conventional fuses. They are sold to the ultimate consumer in most cases as components of a metal housed

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custom-molders' know-how plus STYRON

solves another production problem!





Difficult fabrication problems can be solved economically through the Custom Molder's designing know-how and by his judicious use of the wide range of Styron formulations.

The Custom Molder maintains extensive design and engineering facilities to serve you. Competent technicians, well versed in the problems of plastics and fabrication methods, are your assurance that your product will be designed right—in the right plastic—and produce the most pieces possible, per dollar spent.

Dow Research and the Custom Molders' skill helps you utilize to full advantage the excellent properties of Dow Plastics in your products. Write Dow today and let us put you in touch with a qualified Custom Molder, who can solve your problem.

Plastics Division, Dept. ŞT-64

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DOW plastics

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household load center, containing three or more breaker units. The breakers are automatic and open when too much load is placed on the wiring. Thus when a housewife causes a short circuit with an electric iron she now merely resets the circuit breaker by closing the one which has opened, thereby eliminating the necessity for replacing a fuse or calling a repairman.

Electrical companies report that the average cost for servicing in some localities has been reduced to 30¢ per unit compared to $3.30 where fuses are used. The new load centers may be placed anywhere in the house since they are decorative in appearance and hence need not be relegated to the basement.

There are 4 or 5 oz. of phenolic in the molded parts used in each breaker, and these parts cost in the neighborhood of 12 to 20 cents. This represents about 12% of the manufacturing cost of the finished product. Other material costs such as silver and copper account for over 50% of the production cost. Replacement of fuse boxes with circuit breaker load centers is simple and inexpensive.

Most of these circuit breaker moldings are being made on conventional presses, but Kuhn and Jacob, Trenton, N. J., is turning them out on automatic compression presses at the rate of about 20,000 per month for the I-T-E Circuit Breaker Co., Philadelphia, Pa.

Another phenol plant

CONTRACT for work on excavations, foundations, and underground piping for Bakelite Corp.'s new phenol plant to be erected near Marietta, Ohio, has been awarded to F. H. McGraw & Co., engineer and constructor, of New York, Chicago, and Hartford. Work will get under way at once and is expected to be completed early in 1950.

Polyethylene mattress cover

THE Isolette infant incubator has a new polyethylene tubing mattress cover. The foam rubber mattress is simply slipped into the tubing and the ends of the tube are folded and sealed with tape. This method makes replacement of the cover an easy and quick process which can be done wherever the incubator is used.

The mattress cover is Visqueen film furnished by The Visking Corp.'s Preston Div., Terre Haute, Ind.

Silica pigment for vinyl and rubber

A NEW pigment for use in rubber and vinyl resin compounds has been announced by Pittsburgh Plate Glass Co. It is claimed that this new pigment will make possible the coloring of rubber in many of the brilliant shades now obtainable in other plastics. It is a silica pigment so fine that 300,000,000 particles will fit on the head of an ordinary pin, according to company literature. The specific gravity is 1.95. It is said to impart high tensile strength, good abrasion resistance, and exceptional tear resistance. The pigment, called Hi-Sil, was developed at the company's Barberton, Ohio, research laboratories.

Advertising award

ITS direct mail campaign to promote cellulose plastics won for Hercules Powder Co. the top 1949 award for the plastics industry at the 32nd annual conference of the Direct Mail Advertising Association, Inc., in Chicago. The campaign included four direct mail pieces and the company's plastics magazine and was prepared by Philip A. Belk, who accepted the award on behalf of the Hercules advertising director, Theodore Marvin. The direct mail pieces, distributed at regular intervals throughout the year, included samples of current plastics applications, together with Sundberg-Ferar designs for new products.

Plastic-asphalt floor tile

A RESILIENT floor tile manufactured from a combination of plastic and asphaltic compounds has been developed and put on the market by the Armstrong Cork Co., Lancaster, Pa. Called Arlon, the material is said to combine the richness of plain colors with the practical features of marbleized patterns and is available in 11 shades.

Arlon tile's exceptionally high resistance to alkali makes it practical for installation on or below grade, as well as on suspended wood or concrete subfloors, according to the manufacturer. It is produced in ⅛ and 5/16-in. gages, and in 9 by 9-in. tile only, at Armstrong's factories in South Gate, Calif.; Jackson, Miss.; Kankakee, Ill.; and Lancaster.

New red fluorescent Plexiglas

PLEXIGLAS 587 has been announced by Rohm & Haas Co., Philadelphia, Pa., to replace its original red fluorescent Plexiglas 421. The new material represents an improvement in resistance to fading and loss of fluorescence. It is recommended in locations not exposed to direct sunlight. It is offered at standard color prices in 0.060, 0.125, 0.187, and 0.250 in. thicknesses.

No knots for fishermen

ELIMINATION of knots in nylon fishing leaders has been made possible by the Erwin Weller Co., Sioux City, Iowa, which has introduced level nylon quick-change casting leaders with a loop at one end and a snap at the other, both wire-wrapped and cemented. There are no knots in the leader itself.

The leaders are said to slide easily through rod guides, and the snaps are small enough to be used in fly-fishing and convenient for changing hooks while still fishing.

COMPANY NEWS

American Polymer Corp. began production at its new plant near Springfield, Ill., last September. Equipment at the new plant includes facilities for polymerizing vinyl, acrylic, methacrylic, styrene, acrylonitrile, allyl, and similar polymers. **George Marshall** has been appointed superintendent and **Richard Pease** chief chemist of the new unit.

McNab and Wisner is a new industrial design firm with offices at 485 Madison Ave., New York, N. Y., **Allan McNab**, formerly design director for **Norman Bel Geddes,** has been elected president; **John Wisner**, design director, **City Investing Co.**, is secretary and treasurer.

Gemloid Corp., 79-10 Albion Ave., Elmhurst, L. I., N. Y., is now licensed to use the reverse molded

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What's cookin' on..

PUTTYGUT ROAD



There's plenty of activity out on Puttygut Road, for that is the address of Standard Products' Plastics Division at St. Clair, Michigan.

That activity is the result of Standard's growing reputation for superior quality injection-molded plastics parts and sections.

Equipped with presses ranging from four-ounce to forty-ounce capacities, STANDARD is able to turn out large, complex sections or small precision parts ON SCHEDULE.

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three-dimensional decorative effect covered by U. S. patent No. 2354857, according to company officials, who advise that Gemloid will now be one of a small group of leading molders which are licensed to manufacture plastics products under the **Gits Molding Corp.** patent.

Jacksonville Metal Manufacturing Co., has taken over the firm of **Nemar Plastics, Inc.,** which will be known as **Jacksonville Metal and Plastics Co.,** 247 Riverside Ave., Jacksonville, Fla.

Lupo Research Laboratories, specialist in the development of automatic polishing of metal and plastics by the tumbling process, has moved from Mount Vernon, N. Y., to its new plant at 99-111 Columbus Ave., Tuckahoe, N. Y.

Lippincott and Margulies, Inc., 500 Fifth Ave., New York 18, N. Y., has announced the election of **Laurence H. Taylor,** vice-president in charge of research, as a director, and **Sumner C. Willis,** director of product development, as a vice-president.

St. Regis Paper Co., Panelyte Div., 230 Park Ave., New York 17, N. Y., has announced that **Miss Julia Clendenin** of Miami, Fla., is the winner of the $500 first prize award in its decorative plastics design contest. Second prize was awarded to **J. L. McIver,** a student at Howard University, Washington, D. C.

Radio Frequency Laboratories, Inc., Boonton, N. J., has announced the appointments of **Frank X. Banko** as assistant sales manager, and **William W. Follin** as field engineer for the Washington, D. C., area.

Russell Manufacturing Co., Middletown, Conn., has purchased all common stock of the **Howard Asbestos Co.,** Northfield, Vt. The Howard company name will be changed to **Russell Asbestos Corp.** and will be operated as a wholly owned subsidiary. The Russell company also recently announced its decision to operate a plant at Bennettsville, S. C., to produce certain types of narrow friction fabrics.

Presto Plastic Products Co., Inc., 40 Worth St., New York 13, N. Y., has announced an expansion of its manufacturing space by 110,000 square feet. The additional space will be used to increase its calendering and printing facilities for producing Prestoflex vinyl film in multi-color designs up to 72 in. in width.

The company is now supplying informative labels to manufacturers using its vinyl film. The labels, hang tags, and packaging inserts bear the Good Housekeeping Guaranty Seal and emphasize fire retardance, resistance to grease, and non-peeling of the film. The new label stresses the point that only virgin material is used and helps the manufacturer acquaint the consumer with the "quality" angle in plastic film.

Shaw Insulator Co., Irvington, N. J., has appointed the following new sales representatives: **Frank D. Butters,** 4501 Spatz Ave., Ft. Wayne, Ind.; **Wayne F. Robb,** 1635 N. Downing St., Denver, Colo.; **L. M. Loveless,** 544 Sibley Tower Bldg., Rochester, N. Y.; and **Frank Burke,** 1513 Lynnewood Dr., Havertown, Pa.

Philmont Manufacturing Co., Englewood, N. J., has installed 12 Mayflower high frequency sealing machines and 8 bar sealing machines. The company specializes in the manufacture of hospital protective coverings such as those needed for mattresses and pillows.

Lusteroid Container Co., Inc., Maplewood, N. J., has announced a general price reduction of 10% on its complete line of Lusteroid vials and tubes.

Farrel-Birmingham Co., Inc., Ansonia, Conn., has appointed **David Neill** as its Cincinnati, Ohio, sales representative for gears, gear units, and flexible couplings manufactured in the company's Buffalo plant.

General Electric Co., Pittsfield, Mass., has announced a new operating division to engineer, manufacture, and sell laminated plastics and insulating materials, as a third operating unit of its **Chemical Dept.** The new division, to be known as the **Laminated and Insulating Products Div.,** will have its headquarters in Coshocton, Ohio.

The new division will be managed by **Harry K. Collins,** who has been manager of the **Plastics Div.** New manager of the latter unit, with headquarters in Pittsfield, is **Herbert B. Brusman,** former manager of the **Employee Relations Div.** Mr. Brusman's successor in the latter capacity is **Arthur C. Treece,** formerly manager of the plastics plants at Pittsfield and Coshocton and most recently assistant to the manager of the **Plastics Div.**

The Goodyear Tire and Rubber Co. has announced an expansion program which will double the output of its **Pathfinder Chemical Corp.** plant at Niagara Falls, N. Y. The process employed by Pathfinder utilizes acetylene gas and hydrogen chloride to produce vinyl chloride by a special catalytic process developed in Goodyear's research laboratories.

Gering Products, Inc., Kenilworth, N. J., has announced the appointment of **Gerard C. Heldrich** to take charge of its **Extruded Plastics Div.,** manufacturing and developing polyethylene film and tubing in a standard range of thicknesses and widths, as well as other thermoplastics in special and standard shapes.

Also announced was the appointment of **C. H. Whitlock Associates,** 1601 Fisher Bldg., Detroit 2, Mich., as Gering sales representatives in the states of Michigan, Ohio, and Indiana.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has announced that its combined **Ammonia and Plastics Depts.** will now be known as the **Polychemicals Dept.** The consolidation was effective on Oct. 1. **Dr. J. A. Almquist,** who has been assistant general manager of the **Plastics Dept.** since 1943, will be an assistant general manager of the new department, along with **Dr. Robert L. Hershey,** who has been assistant general manager of the **Ammonia Dept.** All product lines previously manufactured by both departments will be continued.

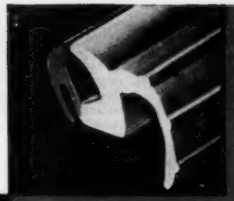
F. J. Stokes Machine Co., Philadelphia, Pa., has appointed as district managers **Malcolm S. Adler** at Cleveland, Ohio; **John C. Meyer** at San Francisco, Calif.; **Robert Platt** at Philadelphia; and **Richard V. D. Strong** at Chicago.

Tennessee Eastman Corp. has announced the selection of a site near Longview, Texas, for the erection of a plant to manufacture certain basic raw materials for use in operations.



TO HOLD GLASS

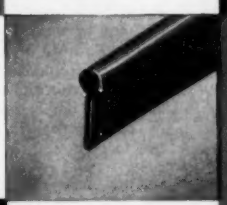
Automotive weatherstripping. Can be furnished in "Tutone", which is one color on inside, different color on outside.





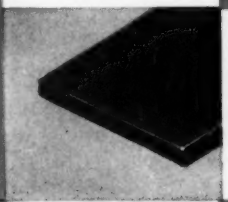
TO SEW THROUGH

Sewing welt may be covered or uncovered when used on upholstery (auto or furniture) or seat covers.



6 PRACTICAL USES *for* POLYVINYL CHLORIDE ELASTOMERIC EXTRUSIONS





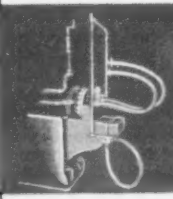
TO SIT ON

Interwoven strips may be heat sealed or nailed to chair frame, are elastic enough for easy sitting.

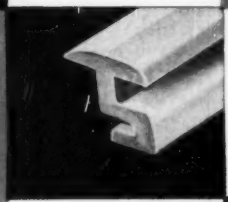


TO PIPE LIQUIDS

Vinyl tubing is efficient for piping liquids. It is impervious to most chemicals. Makes fine garden hose.







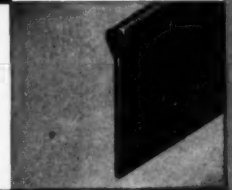
TO SEAL JOINTS

Washing machine window is sealed into the cover with this extruded pure-white gasket.



TO STOP RATTLES

This fender welt is bolted between fender and body to prevent rubbing of metal on metal.



● And very economical, too. These continuous extrusions can be made in almost any cross-section and in a wide variety of colors. Let MACOID discuss your application with you.

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Originators of Dry Process Plastics Extrusion

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EXTRUSION AND INJECTION MOLDING

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at Kingsport, Tenn. Major factors considered in the new plant location were nearness of raw materials such as oil and natural gas, availability of a suitable water supply, satisfactory transportation facilities, manpower, and living conditions.

Heyden Chemical Corp., 393 Seventh Ave., New York, N. Y., has announced a group of new products available in pilot plant quantities. They are anisic acid, anisoyl chloride, ortho-chloro-cinnamic acid, and 4,4'-dichlorobenzophenone. As "building materials" not heretofore generally available, they will be of interest to chemists in plastics and other fields.

PERSONAL NEWS

Richard Baker has been appointed plant manager of **Glass Fibers, Inc.**, Waterville, Ohio. He has been with the company since its inception and until recently was in charge of production control.

Nils Anderson, Jr. has left his position as vice-president of the **Borden Co.'s Chemical Div.** to become vice-president of **Debevoise-Anderson Co.**, 155 E. 44th St., New York, N. Y. In making the move, he joins his father, **Nils Anderson, Sr.**, president of the Debevoise-Anderson Co.

Mr. Anderson joined Borden in 1945, after serving as chief of the plastics section of WPB, becoming vice-president of the Casein Company of America at that time.

John E. McKeen has been elected president of **Chas. Pfizer and Co., Inc.**, Brooklyn, N. Y. Mr. McKeen, formerly executive vice-president, has been with Pfizer 23 years.

John L. Smith, former Pfizer president, becomes chairman of the board of directors. **John L. Davenport**, for 20 years with Pfizer, was elected executive vice-president.

Otto C. Pahline, Akron, Ohio, has been appointed Midwest representative of Sanitile welded floor covering, the new vinyl flooring recently announced by **Interchemical Corp.**

Mr. Pahline was in charge of the **Goodyear** flooring department for over 20 years and was the originator of the present type of sheet rubber flooring.

Dr. George D. Graves has been appointed director of the chemical division of the **Fabrics and Finishes Dept., E. I. du Pont de Nemours & Co., Inc.** He has been with the company for more than 22 years and since 1945 has been assistant director of the chemical division of the Plastics Dept.

Albert R. McIntyre of **Reed-Prentice Corp.**, Worcester, Mass., has been elected chairman of the Worcester - Leominster - Fitchburg Chapter of the Society of the Plastics Industry. **John Resseguie** of **Tennessee Eastman Corp.**, Leominster, was elected secretary and treasurer.

Charles L. Keller has been named manager of the **Plastics Div., Fabricon Products, Inc.**, 1721 W. Pleasant Ave., River Rouge 18, Mich. Mr. Keller has been associated with Fabricon for the past 14 years and has served in various production and sales capacities in the Plastics Div. since its beginning in 1942.

Philip Mixsell has been appointed manager of the **Micarta Div., United States Plywood Corp.**, with headquarters at 55 W. 44th St., New York 18, N. Y.

John M. Torr, founder and general manager of the **Thermatron Div., Radio Receptor Co., Inc.**, has resigned to organize his own business. He will continue his activities in the plastic sealing equipment field, where he expects to offer service in equipment and methods for the plastic film fabricating industry. Pending the availability of suitable facilities in the Metropolitan area, Mr. Torr is temporarily located at West Nyack, N. Y.

C. Benson Branch of the **Plastics Div., The Dow Chemical Co.**, Midland, Mich., has been named manager of the firm's **Technical Service & Development Div.** That division is responsible for market studies and the sale and development of new products as well as the performance of technical service for the firm's customers. Mr. Branch has been with Dow since 1937, and during the war years after 1942 was a production superintendent of Dow's Texas styrene plant. In 1946 he assumed charge of the coatings and raw materials section of the firm's **Plastics Div.**

Dr. William F. Hester, former director of insecticide and fungicide research of **Rohm & Haas Co.**, has been named administrator of the fellowships of **Koppers Co., Inc.**, at Mellon Institute, University of Pittsburgh.

Carlos Holscher, Newtown, Ohio, has purchased **Lea Laboratories, Inc.**, Blade St., Cincinnati. The corporation has been in the chemical business for 12 yr. and specializes in the manufacture and packaging of pharmaceuticals and chemical products according to customers' formulas and specifications. Mr. Holscher was formerly manager of the **Custom Molded Plastics Div., Owens Illinois Glass Co.**, and the **Plastics Div., Drackett Co.**, Cincinnati.

Alvin R. Miller has been appointed chief chemist in charge of the **Chemical and Plastics Development Laboratory** of **Ideal Novelty & Toy Co.**, 184-10 Jamaica Ave., Hollis 7, N. Y.

MEETINGS

Nov. 14—Upper Midwest Section of S.P.E., 6 p.m. at Coffman Memorial Union, University of Minnesota. Harry DuBois, S.P.E. president, will speak on transfer molding and the organization of the national S.P.E.

Nov. 28-Dec. 3—22nd Exposition of Chemical Industries, Grand Central Palace, New York, N. Y.

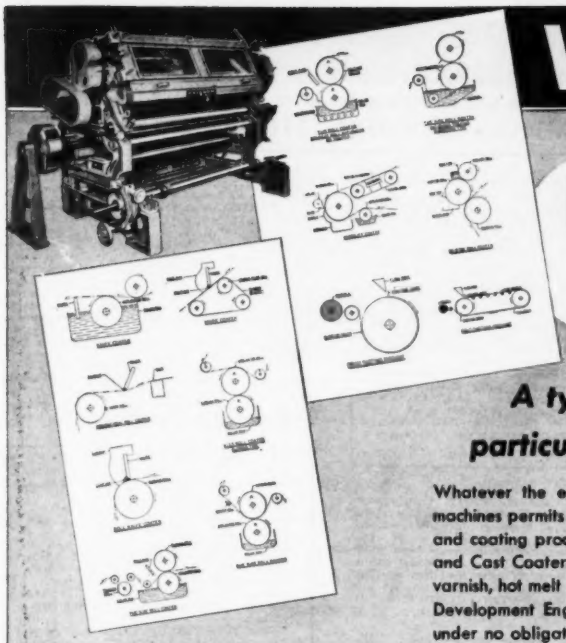
Nov. 30-Dec. 2—Annual Meeting, Society for Experimental Stress Analysis, Hotel New Yorker, New York, N. Y.

Dec. 4-7—Annual Meeting, American Institute of Chemical Engineers, Pittsburgh, Pa.

Jan. 16-19—Plant Maintenance Show, Auditorium, Cleveland, Ohio. First show and conference devoted exclusively to maintenance problems. No charge for either exhibit or conference attendance. Further information may be obtained from Clapp and Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

March 2-4—1950 Spring Conference, Pacific Coast Section of The Society of the Plastics Industry, Inc. Hotel Del Coronado, San Diego.

March 28-31—National Plastics Exposition, Navy Pier, Chicago. Restricted to trade only.



WALDRON

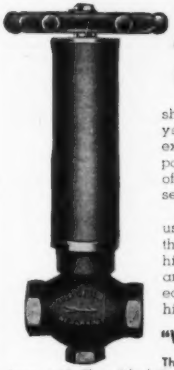
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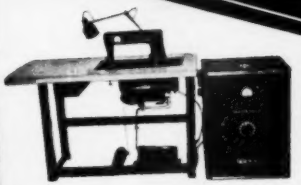
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Machinery and Equipment FOR SALE

12 AUTOMATIC PHONOGRAPH RECORD PRESS UNITS Hydraulic Baldwin Southwark 50 ton automatic tilting head press serial #45580. Taylor Flex-O-Timer No. 179RJ311, 23 x 40 steam plate and double shelf table, (1) 1¼" hydraulic high and low air diaphram valve, (2) ¾" hydraulic air diaphram valves, (1) Vickers high and low pumping unit, 5 H.P. motor, regulating valves, 70 gallon tank, and cooling system. Price $1800.00 HYDRAULIC SAL-PRESS CO., INC., 386-390 Warren Street, Brooklyn, N. Y.

SAVE WITH GUARANTEED REBUILT EQUIPMENT-HYDRAULIC PRESSES: 26" x 24", 13" ram, 400 tons; 36"x36", 19" ram, 425 tons; 24"x42" 340 tons, 2-12" rams; 34"x40" 22" ram, 475 tons; 26"x24" 18½" ram, 800 tons; 24" x 24" 18" ram, 318 tons; 24" x 24", 12" ram, 170 tons; 42" x 42", 16" ram, 250 tons; 36" x 52", 14" ram, 385 tons; 36" x 36", 12" ram, 141 tons; 24" x 26", 10" ram, 118 tons; 20" x 20", 10" ram, 118 tons; 19" x 24", 10" ram, 78 tons; 22" x 15", 8" ram, 75 tons; 15"x15", 8" ram, 75 tons; 12"x12", 7½" ram, 50 tons; 12"x12", 6½" ram, 42 tons; 8"x9½", 4½" ram, 20 tons; 16"x16", 3½" ram, 12 tons; Laboratory press 30 tons 6"x6"; NEW DUAL PUMPING UNITS, ALL SIZES; Worthington Triplex 12 gal. 2200#; 4 plunger 6 gal. 2000#; Watson Stillman duplex box type 1 gal. 2500#; Worthington 1 gal. 10000#; NEW LABORATORY 6"x12" M. D. MILLS; Thropp 16" x 40" M. D. MILL; EXTRUDERS, NRM size 1½" and 2½" Units; PREFORM MACHINES; Stokes R&T, Colton 5 & 5½ T, 2 Stokes DDs 4 with Reeves Drives. Mixers, Accumulators, Vulcanizers, etc. UNIVERSAL HYDRAULIC MACHINERY COMPANY, 285 Hudson Street, New York City 13, N. Y.

FOR SALE: Farrell 18" x 45", 16" x 48" & 15" x 36", 2 roll Rubber Mills. New Lab. 6" x 12". Other sizes 30" to 84". Royle #2 Perfected Extruder, and other sizes. 500 ton Hydr. Molding Press 42" x 48". Field 500 ton 25" x 30". Francis 200 tons 24" x 18". Albert 100 ton 2 opening 24" x 24". 40 ton Broaching Press. Also presses 20 to 500 tons from 12" x 12" to 36" x 36". Watson-Stillman Hor. 4 plgr. 1" x 2" x 4" H. & L. Pressure Pump. HPM 1¾" x 6" vertical triplex 10 GPM 2700 lbs. 7 Hydr. Oil Pumps, Vickers, Oilgear, Northern, etc. Elmes 1" x 4" & 1½" x 4" hor. 4 plgr. 5 to 8 GPM 4500 lbs. & 5500 lbs. Elmes 2" x 6" hor. 30 GPM 2500 PSI. Rumsey 4½" x 8" vert. Triplex 65 GPM 900 lbs. Elmes 2½" x 4" hor. 17GPM 850 lbs. Hydr. Steam Pumps. Low pressure Pumps 150 to 600 lbs. Hydr. Accumulators. Stokes Automatic Molding Presses. Stokes Rotary Preform Tablet Machines 1 3/16", 1¼" and ⅝", also single punch. Colton #5½ T Preform Tablet Machine 3" dia. tablet. Injection Molding Machines 2 oz. to 28 oz. Baker Perkins Jacketed Mixers 200, 100, 50, 9 & 0.7 gals. capacity. New and used Rotary Cutters. Rubber Mills, Calenders, Banbury Mixers, etc. Heavy duty Mixers, Grinders, Pulverizers, Gas Boilers, etc. PARTIAL LISTING. WE BUY YOUR SURPLUS MACHINERY. STEIN EQUIPMENT CO., 90 WEST STREET, N.Y. 6, N. Y. WOrth 2, 5745.

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FOR SALE—Used Machinery, Compression Molding Presses—Laboratory size up to 600 Tons; Injection Molding Machines—1 oz. to 22 ozs; Plastic Extruders 1" to 4½" diameter; Compounding Rolls; Scrap Grinders, Preform Machines—complete equipment for making Molding Powders and for all kinds of Plastic Molding. What do you need? CONSOLIDATED PRODUCTS CO. INC., 13-14 Park Row, New York 7, N. Y.

FOR SALE One Stokes #200 B3 Standard Model Molding Machine, One Standard 300 Ton Flat Bed Compression Press, and One Defiance Preform Press Model #20. Best Offer. Reply Box C1113, Modern Plastics.

HYDRAULIC PRESSES REBUILT TO SPECIFICATIONS for plastic items, industrial purposes and phonograph record presses. We have in the used equipment (1) Baldwin-Southwark 8" x 8 ft. stroke, 2000# W. P. weighted accumulator $1000, (1) French Oil 3" x 42" stroke, 2500# W. P. weighted accumulator $600, (1) 400 ton, 32 x 45, 18" ram, 36" stroke, 12" daylight $2200, (1) 300 ton 30 x 46, 18" ram, 24" stroke, $1800, (1) 400 ton 22 x 30, 16" ram, 18" stroke, 36" daylight $1500, (2) 150 ton 42 x 46, 12" ram, 36" stroke, 60" day-light $900 each, (3) 24 x 24, 250 ton Southwark Presses with push-backs, 15½" ram, 15" stroke, 33" daylight $1450 each. Hydraulic Sal-Press Co. Inc., 386-90 Warren Street, Brooklyn 2, New York.

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Baker Perkins Readco Heavy Duty 100-150 gal. Double Arm Jacketed Mixers.
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Day & Robinson 100, 600, 1000, 1200, 2400 & 4000 lbs. Dry Powder Mixers and Sifters.
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FOR SALE #1 & #2 John Royle extruders, 12 ft. Island Equipment conveyor. 1—30FM syntron. Ball & Jewel grinder. 2 Electric recirculating drying ovens. 1½" & ¾" Holub Dusha rod machine, chucks. 1" Lazaredus rod machine, chucks. Foot and hand presses. Hot water heating tanks. AC-DC motors, ¼ to 1 HP. Carving spindles. John Walker 14" band saw. Electric drills. Box C 1077 Modern Plastics.

(Continued on page 182)

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METAL-WORKING PRESSES · PLASTIC-MOLDING PRESSES · EXTRUSION PRESSES · PUMPS · ACCUMULATORS · VALVES · ACCESSORIES

CLASSIFIED ADVERTISING

(*Continued from page* 180)

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WANTED BY MIDDLE WEST MOLDER

4 and 8 ounce Reed-Prentice Molding Presses. Must be in good operating condition and available for inspection in operation. Reply Box C 1079 Modern Plastics.

WANTED: Late Model 8-ounce or 12-ounce Lester Injection Molding Machine. Must have 12" stroke. If wanted will trade toward above or sell outright late model 10-ounce Reed Prentice Machine in excellent condition. Write P.O. Box 102 Newton Highlands, Mass.

WANTED: Automatic Button Machine "Buttondex" or similar. Reply Box C 1080 Modern Plastics.

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Surplus Nitrate Sheets

Approximately 100,000 Sheets .015 Cellulose Nitrate Clear 20" x 50" trimmed, first quality, packed 200 Sheets per case, price approximate 50% off list.

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WANTED
Acrylic (Lucite and Plexiglas) Scrap
We pay top price for any
quantity in clear and color.
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WANTED BY INJECTION MOLDER 100,000 pounds of Reground Polystyrene. Will pay 15c per pound if material is suitable. Advise colors and quantity available. Reply Box C 1082 Modern Plastics.

WANTED: PLASTIC Scrap or Rejects in any form. Cellulose Acetate, Butyrate, Polystyrene, Acrylic, Vinyl Resin, etc. Also wanted surplus lots of phenolic and urea molding materials. Custom grinding and magnetizing. Reply Box 318, Modern Plastics.

LUCITE & PLEXIGLAS SCRAP
Wanted
Any Quantity — Immediate Payment
Nat Yoffie—585 Washington Street,
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WANTED: Plastic Scrap, Rigid Vinyl, Cellulose Acetate, Polystyrene. Custom grinding, magnetizing and X-raying. Compounding time available. Franklin Jeffrey Corporation, 1671 McDonald Avenue, Brooklyn, N. Y. Es 5-7943

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TOOL ENGINEER — Permanent position with old established firm in central New York to engineer molds, jigs and fixtures. Three to five years plastic experience in compression and injection molding desirable. Please send complete resume to Box C1083, Modern Plastics.

SILVER NITRATE CHEMIST

Plastic Novelty Manufacturer has opening for chemist familiar with deposition of silver. This is an excellent permanent position for the right man. Give age, experience and salary expected in your letter.

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=760 Main Street,
Cambridge, Mass.

PLASTICS PRODUCTION MANAGER to be in full charge of injection molding plant, New York City. State qualifications, salary desired. Write box C1084, Modern Plastics.

WANTED, GRADUATE ENGINEER with minimum of five years' experience to head Plastics Laboratory devoted to design of parts, mold design and selection of proper plastic materials. Should also have working knowledge of all phases of engineering and materials other than plastics. Excellent opportunity for advancement. Reply Box C1085, Modern Plastics.

CHEMIST WITH EXPERIENCE manufacturing powdered phenol formaldehyde resins one and two stage types. Write stating age, experience, references and salary expected. Location Mid-West. Reply Box #C1086, Modern Plastics.

WANTED — MECHANICAL ENGINEER experienced in plastics web handling machinery and plastic converting machinery. Give full details as to experience and salary requirements. Midwestern location. Reply Box C1087, Modern Plastics.

PRODUCTION MANAGER — Experienced in compression and injection molding. Capable of doing cost estimating, mold design and engineering. Unusual opportunity for right man having courage and conviction of his own ability to establish within young, agressive concern a place of importance and security and where his future will be directly proportionate to his contribution to the success of the business. Reply Box C1088, Modern Plastics.

FOREMAN WANTED to take care of injection molding department, 4 reed and 3 lesters, on West Coast. Must have full knowledge of machines. Reply Box C1089, Modern Plastics.

PLASTICS EXTRUSION EXPERT — Take full charge of Extrusion Dept. Must have knowledge of die design and extrusion acetates, Lucite, Vinyl and all other common extruded plastics. For long-established N.Y.C. firm. Excellent opportunity for right man. Write full details to C1090, Modern Plastics.

HELP WANTED—Experienced working engineer full knowledge compression molding, machine maintenance, die setting. Be responsible for production small eastern plant. Would also consider small investment by right party. Reply Box #C1091, Modern Plastics.

PLANT MANAGER wanted for compression and injection molding—25 presses all sizes. Men should have at least 10 years of practical & thorough experience in high production molding, plastic material selection, tool design, mold design & purchasing, and plastic plant administration. Permanent position with nationally known manufacturer of proprietary products in Missouri. Send full resume with earnings and references. Reply Box No. C1109, Modern Plastics.

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PLANT MANAGER—Do not answer this ad unless you are looking for a hard working man with initiative. 10 years experience has enabled me to be thoroughly familiar in all phases of injection moulding, including doing major repairs on machines. I am interested in your proposition if you have a plant in NYC that offers a future. Reply Box #C1107, Modern Plastics.

INGENUITY FOR SALE . . . Outstanding Product Designer seeks permanent position with reputable concern. Has patented and patent pending items: toys, giftware, novelties, packaging. Practical inventive mind, modern functional design. Translates his or your ideas into finished models. Knowledge of injection, extrusion molding and fabrication. Salary-bonus or yearly retainer-royalties arrangement. Samples, references, patents furnished first interview. Reply Box C1112, Modern Plastics.

FOUNDER AND GENERAL MANAGER of long-established injection plant available in near future. Open to purchase or for position in top management. Reply Box C1108, Modern Plastics.

(*Continued on page* 184)

it's revolutionary . . . .

the MOSLO UNIVERSAL MINIJECTOR

ALL-HYDRAULIC 2 OUNCE INJECTION MOLDING MACHINE



The smooth, fast way this newest Moslo Minijector Injection molding machine molds all thermoplastics will get you many more perfect shots per hour at amazingly low operating cost.

The 2 ounce Hydraulic Minijector provides topnotch, big machine performance. It is the latest word in compact, efficient molding machine design. Really engineered for production.

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- Manual or Completely Automatic Operation
- Stainless Steel, Torpedoless cylinder, Pat's. Pend'g.
- Maximum Injection Pressure — 16250 lbs. per square inch
- Plasticizing Capacity — 25 pounds
- Mold Casting Area — 30 square inches
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- Universal mold-clamp assembly (operates vertical or horizontal)

Immediate inquiries invited to insure early delivery.

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¾ OUNCE HYDRAULIC MINIJECTOR
¾ OUNCE HAND OPERATED MINIJECTOR
Small custom moldings, color chips, samples, tensile and compression bars are economically produced on these low-cost MINIJECTORS. They feature demountable, interchangeable cylinder and heater units which permit change of materials and colors in only 3 minutes. Write for details.

How YOU can get precision in molds



. . . . even in LARGER SIZES

Molds by Precision Tool & Die Co., Bronson, Mich., for Newell Mfg. Co., Lowell, Mich

Here's a cavity for a gunstock—measuring 14¼" x 7½" x 2½"—TRU-CAST by Manco—of beryllium copper. The molder lauded the outstanding performance of the cavities of the mold—the perfect matching partlines—the true fidelity of the molded pieces.

Send us your blueprints; let us quote on your needs.

BERYLLIUM COPPER AT ITS BEST — TRU-CAST by MANCO

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For PANTOGRAPHIC ENGRAVING ON PLASTICS

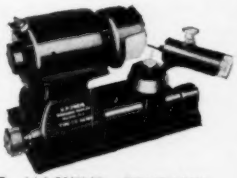


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Panto Engravers rugged and precision-built, for accurate and clean-cut engraving on plastic and metal products.

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MODEL CG GRINDER for quick and accurate sharpening of engraving and routing cutters.



Write for illustrated catalog

H. P. PREIS ENGRAVING MACHINE COMPANY
453 ROUTE 29 HILLSIDE, NEW JERSEY

MARKING PANTO EQUIPMENT

CLASSIFIED ADVERTISING

(Continued from page 182)

CHEMICAL ENGINEER—plastics extrusion, low and high pressure laminating, forming, fabrication, compounding, molding. Experienced, capable and responsible in development, planning, production, administration. Broad technical, mechanical and practical background; successful record of results. Desires progressive permanent position fully utilizing abilities. Reply Box C 1098, Modern Plastics.

INJECTION MOLDING MACHINE DESIGNER seeks employment with large molding concern interested in designing and building machines for own use. Mechaical engineering background and thorough knowledge of plastics and molding. Minimum salary $6,000.00. Resident of New England, will go anywhere. Reply Box C 1092, Modern Plastics.

CHIEF CHEMIST — TECHNICAL DIRECTOR AVAILABLE. Successful Ph.D., 38, long experience vinyls, styrene copolymers, coatings, adhesives, plastic foams, synthetic rubbers. Publications, patents, technical society activities. Supervisional background. Location secondary. Available promptly. Reply Box C1093, Modern Plastics.

PROPRIETARY PRODUCTS AND CUSTOMER SERVICE CAN BUILD YOUR VOLUME—Young executive has had an unusual and varied background in Industrial Design, Manufacturing and New Product Development. He is seeking a progressive plastics company or merchandising organization who are primarily interested in building greater volume with new Proprietary Products and capable customer design service. He has an unusual record for increased sales through product design in housewares, appliances, toys, novelties, packaging, etc. He prefers to earn or buy an interest in this company. Reply Box C1095, Modern Plastics.

PLASTIC ENGINEER with six years experience, including year and a half as plant supervisor desires position with established firm. Background includes thorough knowledge of fabricating and forming of thermoplastics; lucite, plexiglas, vinyl, acetate and royalite. Graduate engineer with knowledge of drafting, design, production, quality and material control. Young and aggressive. Desires location in New York area. Reply Box C1094, Modern Plastics.

SITUATIONS WANTED—Extrusion Engineer Available with many years experience. Can take charge of production and design. Thorough understanding of plant set up, equipment, technique, various cross-sections and types of plastics. At present in west but can locate anywhere. Excellent references. Reply Box C1096, Modern Plastics.

LAMINATIONS, COATINGS, IMPREGNATIONS, EXTRUSIONS: Textiles, papers, films, metals. Production and development; both large and small company. Technical Director; Executive Vice-President. Wish to leave present connection. Available for half-days' arrangement in any technical phase of business. Ph. D. in Chemical Engineering. New York City area only. Reply Box C1054, Modern Plastics.

INJECTION PLANT SUPERINTENDANT. Employed for past 10 years as Superintendant of large New England plant. Supervises every phase of engineering and manufacture. Over 20 years injection molding experience. Complete and thorough knowledge of all thermoplastics. Able to set-up all kinds of injection molding presses for efficient, economical operation. Presently employed. Desires similar position with greater opportunity. Reply Box C1007, Modern Plastics.

MARRIED MAN—36 years old desires to contact one or two parties interested in setting up compression-injection mold shop. Have 15 years practical experience in compression, transfer, and injection molding. Am qualified to take complete responsibility for purchasing and installing equipment and putting plant in production. Have been instrumental in establishing highly successful molding company. Phd. in Chemical Eng. Reply Box C1110, Modern Plastics.

Molds Wanted

WE WANT MOLDS—Your useless or obsolete molds may be useful to us. Large figures are of particular interest. Send full particulars and sample pieces or description. Reply Box C1099, Modern Plastics.

WANTED TO PURCHASE
Obsolete or discontinued Plastic Injection Toy Molds. State condition and best cash price. Reply Box C1036, Modern Plastics.

REPRESENTATIVE OF FOREIGN MANUFACTURERS wants successful American molds (pref. toys) for 1-8 oz. machines on purchase, hire or Royalty Basis. All accounts will be paid in USA $. Replies with 6 samples to Box C1100, Modern Plastics.

WANTED TO BUY—Injection mold for ASTM test specimens. Reply must include description, dimensions, price and condition. Reply Box C1101, Modern Plastics.

INTERESTED PURCHASING used compression molds any items suitable for 150 ton Stokes press. Reply Box C1102, Modern Plastics.

Molds For Sale

8 injection mold dies, 2 rubber tire mold dies and 1 set of plates for printing boxes. Interesting and educational knocked-down toy tractor. Dies, in excellent condition, originally cost $14,000. Sale price, $3,000. Reply Box C1111, Modern Plastics.

Miscellaneous

LET'S TALK BUSINESS if you manufacture, merchandise or distribute plastic products and are presently interested in developing a fine new product. Have a top novelty invention with unlimited market potentialities. U. S. Patent recently issued and Canadian Patent applied for. Plastic model of invention will illustrate important features and merchandising scope to interested persons. Will welcome inquiries and personal discussion. Reply Box C1103, Modern Plastics.

BRITISH MANUFACTURER desires to make an arrangement with either an American Manufacturer, Manufacturer's Agent or Business Consultant with a view to a regular exchange of ideas etc. to their mutual advantage. Write Mr. S. Stein, 23 Chadwick Road, Westcliff-on-Sea, Essex, England.

RETIRED representative with sales connections would like to invest in small, going molding plant in N. Y. or Long Island. Write stating size of plant, number and capacity of injection molding equipment. Reply Box C1105, Modern Plastics.

WANTED: Complete plants, also individual items such as: Mixers, grinders, 2-roll mills, extruders, etc. Reply Box C1019, Modern Plastics.

PATENT RIGHTS FOR SALE OR LICENSE. Plastic car visor. A formed, all plastic car visor which extends full width of windshield, is mounted inside and fully adjustable. Proven highly successful over period of fourteen months. Sells on sight. Ready for nation-wide market. Write C. I. Walker, 212 — 18th Street South, Great Falls, Montana.

FOR SALE—COMPLETE COMPRESSION MOLDING PLANT fully equipped and ready for operation. Has 4-200 ton presses, tool room with standard equipment, including two pantographs, finishing room complete with paint spraying equipment, power driven belt conveyor for assembly and all accessory fixtures. Factory and general offices completely equipped. Buildings about 17,000 sq. ft. in excellent condition with practically new oil heating and electrical systems. Four acres of land provides ample room for expansion. Seven room residence on property. Located in small town near Buffalo, N. Y. with favorable labor conditions and low tax rates. Reply Box C 1078 Modern Plastics.

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Representatives Wanted

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or Manufacturer's Agents for the new MacRay Injection Molding Presses and equipment. Must know plastics and have contacts in this field. Commission basis. Areas available: Detroit, Milwaukee, St. Louis, Boston, Minneapolis, Philadelphia, Dallas. See our ad on Page 149 this magazine. Write giving full details, in first letter, of your experience and territory covered. MacRay Engineering Co., 6611 Euclid Ave., Cleveland 15, Ohio.

MANUFACTURERS REPRESENTATIVES WANTED—Midwestern molder featuring ultra-modern molding equipment for thermosetting materials desires additional sales representatives. Several good industrial territories open . . . commission basis. This is an unusual opportunity, since molding equipment gives many advantages in production of parts for home utility, hardware, and electrical products. Reply Box C 1104 Modern Plastics.

WANTED
SALES REPRESENTATIVES
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NOVEMBER, 1949

Acryvin Corp. of America 169
All Purpose Gold Corp. 187
Allied Products Corp. 29, 155
American Cyanamid Co., Plastics Division 102, 103
American Insulator Corp. 68
American Molding Powder & Chemical Corp. 122
American Pulverizer Co. 147
Amos Molded Plastics 30
Anderson Bros. Mfg. Co. 145
Apex Machine Mfg. Corp. 141
Art Roll Leaf Stamping Co. ... 135
Atlas Coatings Corp. 124
Atlas Valve Company 179
Atrax Company, The 153
Avery Adhesive Label Corp. ... 41

Bakelite Corporation Inside Back Cover
Bamberger, A., Corp. 151
Barker-Davis Machine Co., Inc. 136
Bethlehem Steel Company 50
Boonton Molding Co., The 155
Borden Co., The, Chemical Division 64
Bridgeport Moulded Products, Inc. 42
Buttondex Corporation 154

Cabot, Godfrey L., Inc. 129
Carbide and Carbon Chemicals Corp. 57
Carver, Fred S., Inc. 58
Cast Optics Corp. 144
Catalin Corporation of America 1
Cavagnaro, John J. 134
Celanese Corp. of America Plastics Div. 9
Chicago Molded Products Corp. 4
Claremont Waste Mfg. Co. 106
Classified 180, 182, 184
Cleveland Vibrator Co., The ... 134
Columbia Protektosite Co., Inc. 18
Conforming Matrix Corp. 132
Consolidated Molded Products Corp. 10
Cruver Mfg. Company 44
Cumberland Engineering Co., Inc. 187

DeBell & Richardson, Inc. 125
Detroit Macoid Corp. 177
Detroit Mold Engineering Co. .. 188
Diemolding Corp. 156
Dow Chemical Co., The 173
Drakenfeld, B. F. & Co., Inc. .. 138
Dupont de Nemours, E. I. Co., Inc., Plastics Dept. 7
Durez Plastics & Chemicals, Inc. .....Inside Front Cover

Eastman Kodak Company 121
Elmes Engineering Div. of American Steel Foundries ... 181
Erie Resistor Corp. 59

Fabricon Products, Inc., Plastics Div. 146
Farrel-Birmingham Co., Inc. .. 26
Fellows Gear Shaper Co., The, Plastics Machine Div. 45
Ferro Chemical Corp. 169
Ferro Enamel Corp. 141
Foremost Machine Builders, Inc. 166
Formica Company, The 53
French Oil Mill Machinery Co., The 148

General American Transportation Corp. Plastics Div. ..38, 39
General Electric Company Back Cover
General Electric Company, Phenolic Materials Div. 63
General Industries Co., The, Plastics Div. 109
Gering Products, Inc. 67
Glenn Electric Heater Co. 164
Goodrich, B. F., Chemical Co. .. 3
Goodyear Tire & Rubber Co., Chemical Div. 11
Gotham Plastics Corp. 22
Gypsy Dyes Inc. 171

Hercules Powder Company, Inc. 47
Holliday, W. J., & Co., Inc. ... 55
Hydraulic Press Mfg. Co., The .. 13

Industrial Research Laboratories, Ltd. 135

Jackson & Church Company .20, 21
Jackson & Church Co. & R. H. Windsor Ltd. 32, 33

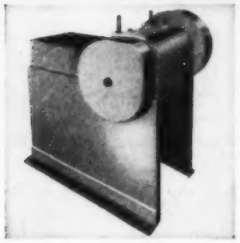
Keyes Fibre Company 51
Kimberly-Clark Corp., Plastics Div. 142
Kingsley Stamping Machine Co. 146
Koppers Company, Inc. 43
Kuhn & Jacob Molding & Tool Co. 128
Kurz-Kasch, Inc. 16

Lane, J. H., & Co., Inc. 162
LaRose, W. T., & Associates, Inc. 66
Lester-Phoenix, Inc. 24
Loma Plastics, Inc. 12
Lucidol Div., Novadel-Agene Corp. 147

MacRay Engineering Co. 149
Manco Products Company 183
Marblette Corp., The 115
Martin, Glenn L., Co., The 61
Martindell Molding Co. 123
Mayflower Electronic Devices Inc. 179
Mearl Corporation, The 162
Mears-Kane-Ofeldt, Inc. 154
Merit Products, Inc. 150
Michigan Molded Plastics, Inc. .. 163
Midland Die & Engraving Co. .. 94
Mills, Elmer E., Corp. 35
Minnesota Plastics Corp. 62
Modern Plastic Machinery Corp. 49
Molded Products Corp. 36
Monsanto Chemical Co., Organic Div. 185
Monsanto Chemical Co., Plastics Div. 17
Mosinee Paper Mills Co. 133
Moslo Machinery Company 183
Muehlstein, H., & Co., Inc. ... 125

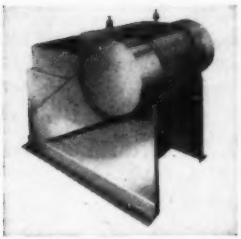
(Continued on page 188)

Cumberland Machines for the Plastics Industry



CUMBERLAND ROTARY CHOPPING MACHINE

This machine cuts slab material from compounding mills, chops continuously extruded rods, sheets of stands and cuts up calendar roll side shear strips. This machine is also used in conjunction with extrusion machines to produce cube or pellet material suitable for a molding compound.

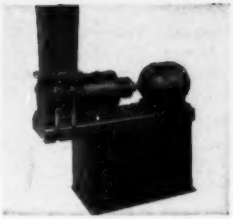


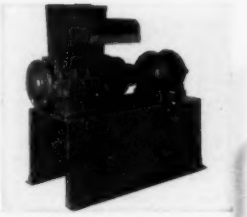
CUMBERLAND SLITTING & MANGLING MACHINE

This machine is useful primarily to manufacturers who compound plastic materials. The machine may be used to reduce material for use as a commercial product without further granulating. Or it may be used to prepare material for subsequent final reduction in a granulating machine.

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These machines are designed especially for plastics. They perform with high efficiency the special cutting requirements of plastic materials. They are simple in design, rugged in construction and are easy to dismantle and clean. These machines are built in two styles. Nos. 0, ½ and 1½ as at top right (No. ½ is illustrated). Also, large 19' machine, double hung, with retractable knife block for complete accessibility. (illustrated at right below.)





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ADVERTISERS INDEX

(*Continued from page 186*)

Nash, J. M., Company 54
National Rubber Machinery Co. 167
National Tuberculosis Association 188
New Jersey Machine Corp. 161
Newark Die Company 159
New Hermes 159
New York State Dept. of Commerce 163
Nixon Nitration Works 27
Northern Industrial Chemical Co. 171
Norton Laboratories, Inc. 137

Parker-Kalon Corp. 46
Plaskon Div., Libbey-Owens-Ford Glass Co. 98, 99
Plastics Industries Technical Institute, Dept. of West Coast University 166
Plax Corporation 31
Preis, H. P., Engraving Machine Co. 183
Price-Driscoll Corporation 148
Printing Industries Equipment Co., Inc. 167
Prophylactic Brush Co. 60

Quinn-Berry Corporation 56

Radio Receptor Co., Inc. 156
Railway Express Agency 175
Recto Molded Products, Inc. ... 138
Reed-Prentice Corp. 8
Richardson Company, The 6
Rohm & Haas Co., Plastics Div. 19
Rohm & Haas Co., Resinous Prod. Div. 119
Royle, John, & Sons 123

Safety Car Heating & Lighting Co., Inc., Entoleter Div. 169
Santay Corporation 165
Schulman, A., Inc. 132
Schwartz Chemical Co., Inc. ... 145
Sillcocks-Miller Co., The 149
Standard Products Co., The 175
Standard Tool Co. 150
Stanley Chemical Co. 164
Stokes, F. J., Machine Co. ... 40
Stricker-Brunhuber Corp. 136
Swedlow Plastics Co. 23
Synthane Corporation 139, 140

Tennessee Eastman Corp. 113
Thropp, Wm. R., & Sons Co. .. 144
Timken Roller Bearing Co., The 131
Titanium Pigment Corp. 37
Tupper Corporation 52

Van Dorn Iron Works Co., The 127
Vareum Chemical Corp. 25
Victory Mfg. Company 153

Waldron, John Corp. 179
Waterbury Companies, Inc. 187
Watertown Mfg. Co. 143
Watlow Electric Mfg. Co. 143
Watson-Stillman Company ..14, 15
Welding Engineers, Inc. ..116, 117
Westchester Plastics, Inc. 34
White, S. S., Dental Mfg. Co., The 142
Windsor, R. H., Ltd. 65
Witco Chemical Co. 28
Worcester Moulded Plastics Co. 190

Yardley Plastics Co. 48

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Because of the importance of the above message, this space has been contributed by

MODERN PLASTICS, INC.

a vital message to every executive in the plastics industry:

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The January issue will be an out-and-out, meticulously documented promotion piece aimed at *proving* the indispensability of plastics to every segment of American industry.

Complete in this one issue—and with DOUBLE the normal amount of editorial material—will be an industry-by-industry, product-by-product analysis showing HOW and WHY plastics build better products, better value, better performance, better appearance or lower price.

Each case history will be documented with every available fact and figure relating to production, merchandising, marketing, sales and costs!

Complete and self-contained, this issue will present so powerful and convincing a message that it will become an essential sales tool for every salesman in the industry.

CIRCULATION WILL HIT 25,000— GUARANTEED

To make certain that the issue reaches *top management* in every plant where plastics can find a major market, the regular circulation will be augmented by selective distribution to hand-picked lists of important manufacturing companies throughout the country. As a result, circulation will reach a guaranteed figure of 25,000—or about 25% more than that of a regular issue!

YOU CAN SHARE IN THIS GIANT PROMOTION

Every company in the plastics industry has a stake in the tremendous sales promotional effect which the January issue will create. Your own special advertising message—built, preferably, on the theme of the January number, "Plastics Build Better Products and Better Values"—will enable you to share in the sales-stimulating effect of this uniquely powerful issue.

Start planning your advertisement now. But don't forget the first important step: write, phone or wire to get your space reservation in. Final deadline is November 28. *Modern Plastics, 122 East 42nd Street, New York 17, N. Y.*

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ABC



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With the consumers' trend toward self-service and impulse buying, there's no place on dealers' shelves for a product that is shy and retiring at point of sale. Many a manufacturer of such a product turns to Worcester Moulded Plastics for a new sales personality for their "problem" products. With our complete custom injection moulding service all under one roof, we stand ready to help produce a durable, eye-catching plastic product or part for you that will stand out in a crowd. We guarantee a volume production to dovetail with your own. Since we neither manufacture nor market any product of our own, yours is given our undivided attention.



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This message deals with "BAKELITE" PHENOLIC LAMINATING PLASTICS

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The widely used decorative laminates have core stocks made with BAKELITE Phenolic varnishes which impart such characteristics as high tensile, flexural and compressive strengths, and lightness in weight.

Typical uses: Table, counter, and bar tops; wall paneling.

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The translucent grades transmit and diffuse light. Because they are heat-resistant they can be used near light sources. They "accept" close register multicolor printing and silk screening.

Typical uses: Radio and television dials; illuminated signs and displays.

3. LARGE INDUSTRIAL PANELS



Large size panels up to 5 ft. 7 in. by 12 ft. 9 in., by ¼ in. and larger on special order, have high mechanical strength, are lastingly smooth, and resistant to moisture and chemicals.

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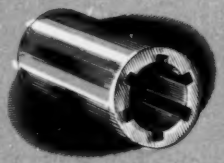
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Superior electrical insulation for high frequency circuits, with good mechanical strength, moisture resistance, heat resistance, machinability, permanence of form, and economy.

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5. HEAVY DUTY BEARINGS



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Typical uses: Slipper and roll neck bearings for steel mills; marine propeller-shaft bearings.

6. INDUSTRIAL GEARS AND PINIONS



Laminated plastic gears are resistant to oil, grease, and moisture. With high tensile and impact strength, they have long, economical service life with remarkable operating quietness.

Typical uses: Automotive timing gears; industrial gears and pinions.

7. MACHINED PARTS



Plastic laminates are readily machined by standard tools, can be threaded, tapped, milled, turned, punched, and sawed. Certain grades are adaptable to low-cost postforming in simple jigs.

Typical uses: Ball bearing retainers; aircraft pulleys; telephone selector units.

8. CHEMICAL HANDLING EQUIPMENT



Plastic laminates are non-corrodible and resistant to water, brine, oil, ordinary solvents, most acids and weak alkalies. They retain high mechanical strength and great resistance to wear under corrosive conditions.

Typical uses: Chemical pump parts; electroplating barrels; textile spinning pots.

9. MOLDED LAMINATES



This class of plastics lies midway between conventional molding and laminating materials. They provide the strength and wear resistance of laminates in shapes and forms molded to precise dimensions.

Typical uses: Industrial truck wheels; miners', firemen's and workmen's helmets.

Laminates made with BAKELITE Phenolic Laminating Varnishes are available in sheet, tube, rod and molded-laminated forms. They are produced by application of heat and pressure on layers of paper, fabric, asbestos, or glass cloth impregnated with BAKELITE Phenolic Laminating Varnishes. The resulting materials are infusible and insoluble—possessing many properties for myriad uses. Specific instructions on machining, bonding, and postforming laminated plastics made with BAKELITE Phenolic Laminating Varnishes can be obtained from individual laminators. The names of leading laminators will gladly be furnished—along with technical assistance from Bakelite Corporation representatives—if you will write to Department M-13.

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This soap dispenser is a good example of what General Electric's *complete* plastics service might do for *your* product.

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GENERAL ELECTRIC

CHS-A48

General Electric plastics factories are located in Coshocton, Ohio, Decatur, Ill., Taunton and Pittsfield, Mass.